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APRIL 1990

MacUser

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people thought the t nitro and glycerin.

If you own a Mac® you may already know what a phenomenally powerful piece of software Microsoft® Word is.

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Well here's something you probably don't know:

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We call this unprecedented feature "warm links." But you'll be more inclined to call it the best thing for revising documents since white out.

Imagine it's the end of the day and tomorrow's the BIG presentation. You've been working with the sales manager to incorporate his Microsoft Excel projections into your report. You're finally done. But wait. Suddenly he makes one of his famous last-minute changes to the spreadsheet.

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Then again, some same thing abou



Nobell Chem Revenue Potential

Product Portfolio Breakout

High Growth Markets	1989	1990	1991	1992
Medical Applications	15	25	40	60
Industrial Applications	30	39	46	51
Total	*45*	*64*	*86*	*111*
% of total	55%	63%	68%	72%
Mature Markets				
Defense Applications	36	38	40	42
% of total	45%	37%	32%	28%
Total Revenue	*81*	*102*	*126*	*15*

Nobell Chem

Report to the Board of Trustees

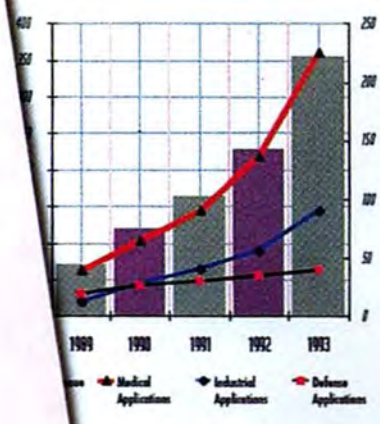
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…now become a leading marketer of Nitro Glycerin in pill form, to aid …l uses. As a result of this development, Nobell Chem is now expanding …istribution channels.

	1989	1990	1991	1992	1993
	15	25	40	60	85
	30	39	46	51	72
	36	38	40	42	44
	81	*102*	*126*	*153*	*201*

Explosive Growth Potential

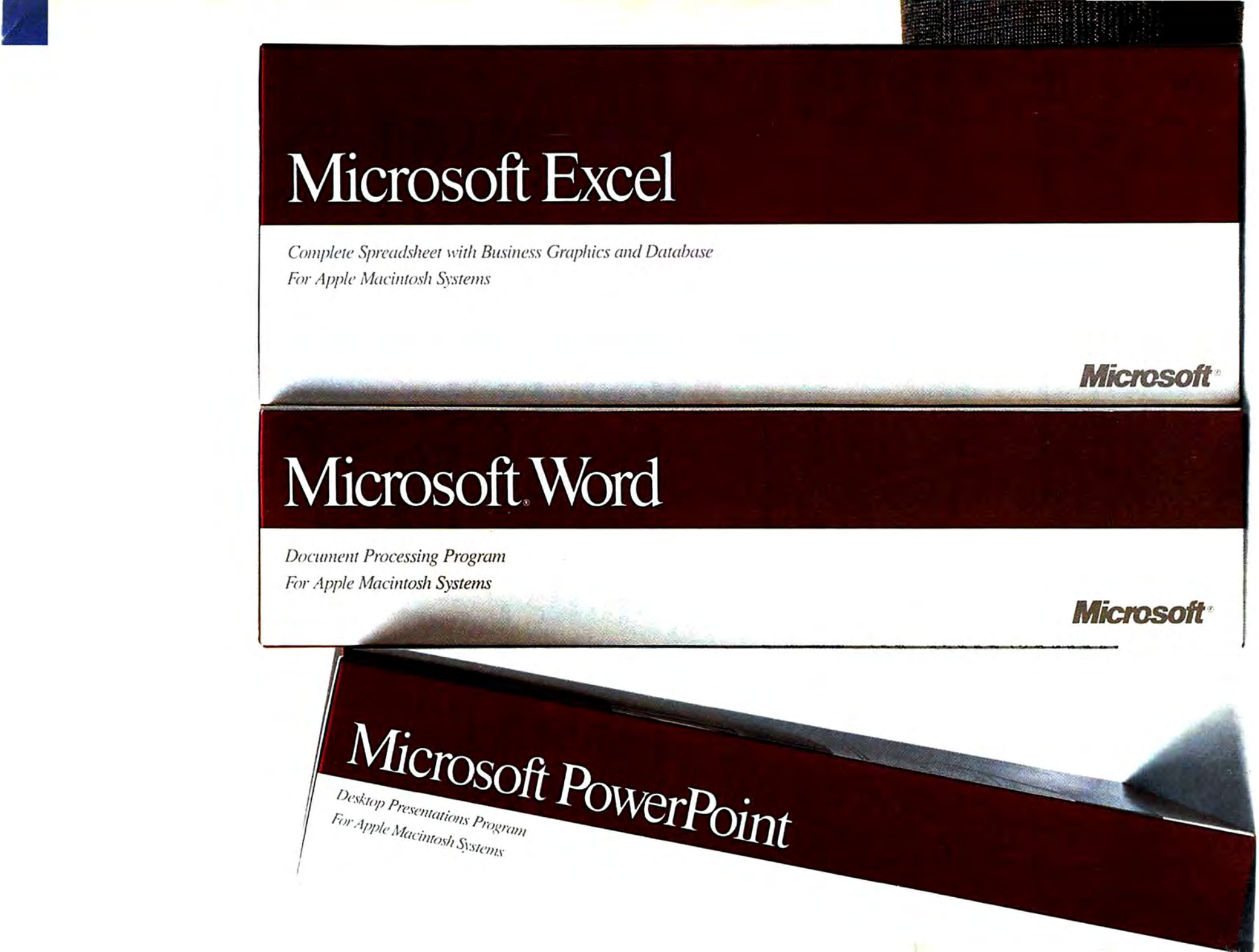


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Explosive Growth Potential



Some people think there's no particular advantage to combining Microsoft applications.


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For Apple Macintosh Systems
Microsoft
Microsoft Word
Document Processing Program
For Apple Macintosh Systems
Microsoft
Microsoft PowerPoint
Desktop Presentations Program
For Apple Macintosh Systems

MacUser

StartUp



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Address Book Plus: Your little black book will never be the same.
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PostShow: See the results of your PostScript code posthaste.
Letter Writer Plus: A first-class mail-merger.
DeskWriter: Hewlett-Packard debuts its first Mac printer, and it's a winner.
Virtual 2.0: A memory-management virtuoso in a virtually brand-new version.
Precision: A quirky CAD package with promise.
My Time Manager: Organizational help for the well-appointed Mac user.
Nutrition 2.0: A HyperCard stack that makes it easy for you to eat right.
KernEdit: Build kerning tables fast.
The Vietnam War: A historical HyperCard tour de force.
Halls of Montezuma: You too can send in the Marines.
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and
Derek Van Alstyne
1967 – 1989

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Technical Difficulties and Help

Although we can't offer any telephone assistance, *MacUser* welcomes your technical questions. If you've got a Mac question or problem, send it to Help Folder, *c/o MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. If we can't give you an answer, we'll find someone who can. Because of the volume of mail we receive, we can't answer all your questions, so we also recommend that you take advantage of your local user groups. You can find the one nearest you by calling Apple toll-free at (800) 538-9696, ext. 500.

Tips, Hints, and Programs

We love to get tips and hints (on a disk, please) from our readers. Any tips should be sent to Tip Sheet, *c/o MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. We can't print every tip, but we try our best to pick the most interesting and representative ones for publication. We'd also like to hear from any programmers who are interested in contributing to our utilities disk series or labs-benchmark disk series. If you're interested, contact Michele Stokol at the address above.

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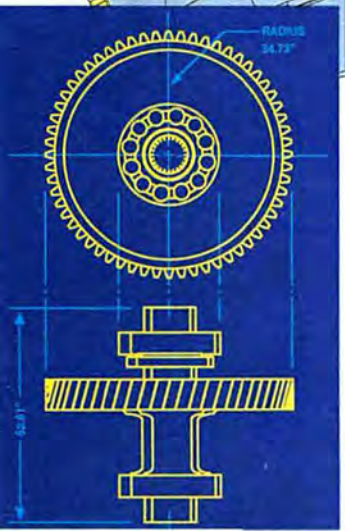
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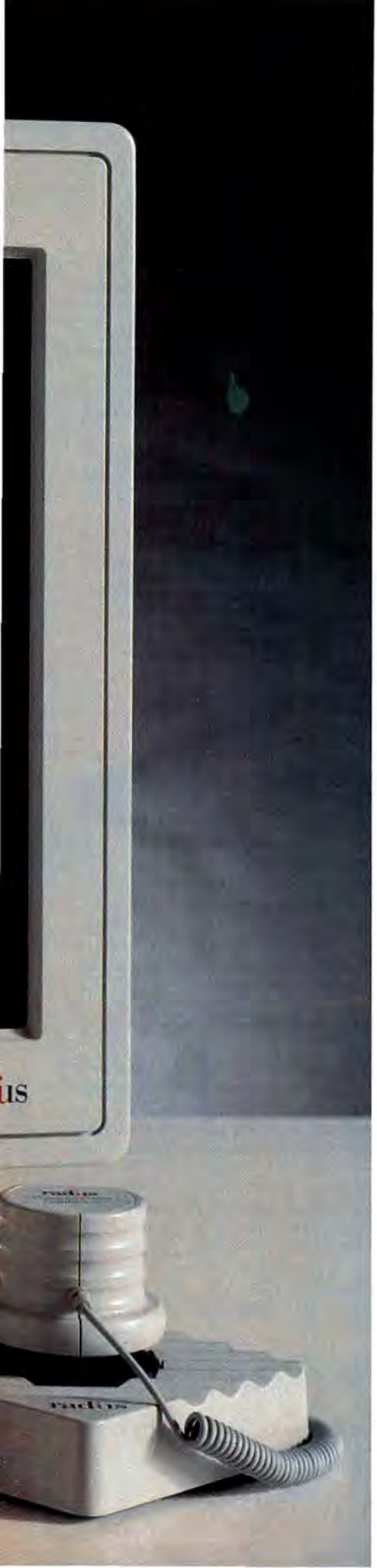
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Page 1
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About MacUser

Up the Anti-Editor

His fans are easy to spot. They're the ones who read *MacUser* from back to front. John C. Dvorak — author, columnist, and *MacUser* Anti-Editor — writes more column inches about computers per year than just about anyone writing about anything. You can read him in *PC Computing*, *PC Magazine*, *DEC Professional*, the *Vancouver Sun*, the *San Francisco Examiner*, *Microtimes*, and on and on.

Since *MacUser*'s first issue, though, Dvorak's favorite place to publish has been our last page. That is, until this month. But don't despair, Dvorakians: Here's a look back at Dvorak's greatest quips.

On the Mac

"Businessmen want computers on their desks, not Cuisinarts." — 10/85

"Give the Macintosh to an eight-year-old and see what kind of person immediately falls in love with the machine." — 11/85



***MacUser*'s first and only Anti-Editor.**

... New Technology

A/UX: "The biggest blunder in the history of the company." — 5/88

Multimedia: "Simply put, a fancy sham. It's promoted by the natural-born hucksters within Apple because it has all the earmarks of something trendy and fashionable." — 10/89

Stackware: "Endless scanned images of *Playboy* pinups combined with digitized moaning and groaning." — 10/88

Open Systems: "The biggest crock ever foisted on the public in the entire history of Western Civilization." — 11/89

... Mac Users

"The Macintosh is a screwball computer and it attracts screwballs to it." — 6/86

"Soon they are redesigning icons and dicking around with the innards of the machine in ways that make the thing unusable to anyone else. My advice: find real work!" — 9/86

"Although I was once the most vocal critic of the Mac and its dingbat users, I'm getting a bad feeling about their exodus from the scene." — 12/89

... John Sculley's

... *Speeches:* "This is the new Apple, I thought to myself as I bit my cheek in an attempt to stay awake." — 5/86

... *Fashion sense:* "He sported an ill-fitting blue blazer, striped shirt, a red and blue regimental tie, *green* corduroy pants with cuffs, and brown shoes." — 1/87

... *Vision:* "Earth to Sculley! Earth to Sculley! Come in. Come in." — 4/88

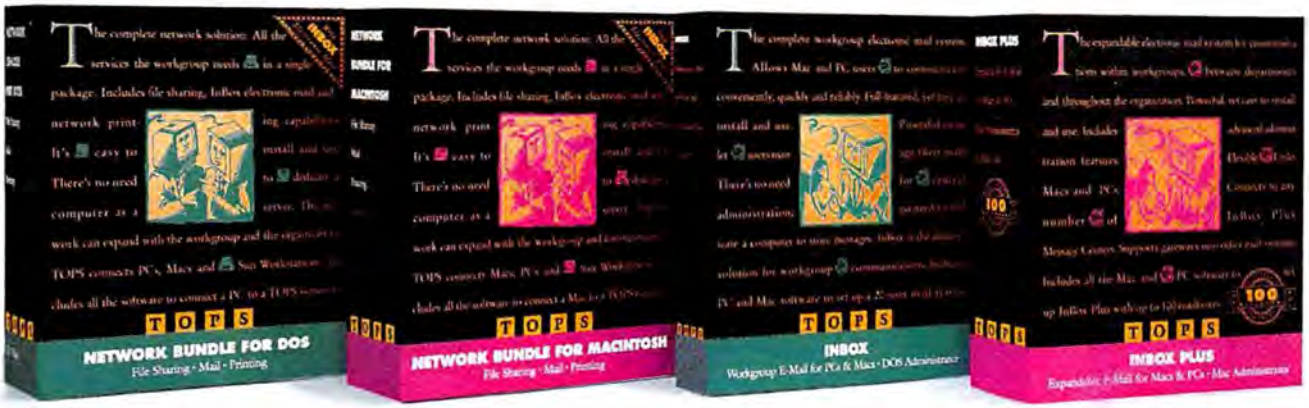
... Marketing

"Where is the commemorative Macintosh-shaped bottle of Jim Beam?" — 8/86

... John C. Dvorak

"But what do I know? I'm paid to complain." — 11/86

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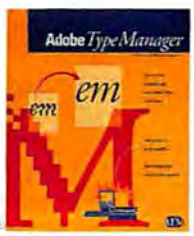

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LETTERS

Jorge Froilán González of Falcon Heights, Minnesota, notes that Microsoft's recent advertisements for PowerPoint depict a world map supposedly used by Columbus in a presentation to the queen of Spain — a world that excludes America but includes Australia. "Australia was discovered by Europeans well after 1492. It's probable that Microsoft has some reason for publishing such a version of the world map. I would be most thankful if you could enlighten me." Sure, Jorge, right after you tell us how Columbus got access to a Mac 493 years before its ship date.

WRITE TO

Letters to the Editor, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

All letters become the property of *MacUser*, and we reserve the right to edit any letters we print. Please include a return address and daytime phone number.

COMPILED BY JAMES BRADBURY

Readers Remember

After reading your tribute to your colleagues John Anderson and Derek Van Alstyne (January '90), I was quite impressed with *MacUser* as a whole. Not only have I learned from Tip Sheet and Help Folder, but I've also learned from the fun, thoughtful memories that fellow employees had of two dedicated guys they loved and respected.

Thank you for allowing us to meet John and Derek — two people who obviously meant more to you than "human interface."

Dianne M. De Leon
Dallas, TX

I opened my January *MacUser* with my usual enthusiasm, to come face-to-face with "In Remembrance."

I didn't know John Anderson, but he wrote something so true I had to hang it on my wall. So I'll miss him too, and I doubt that I'm the only one in that nameless mass of readers out there who feels the same.

The quote I hung on my wall, by the way, is: "Memorization is a function of duty; knowledge comes from love."

Bernadette Dell Kidd
Riverside, CA

Many readers asked what they could do in tribute to Derek and John's memory. Ziff-Davis has established a trust fund to benefit John Anderson's children, Katherine and Peter. In addition to making its own contribution, Ziff-Davis will match any contributions made by members of the various communities to which John and Derek belonged. Checks should be made payable to The Anderson Trust Fund, c/o Nancy Woods, Human Resources Department, One Park Ave., New York, NY 10016.

In addition, a memorial Triathlon Fund in Derek Van Alstyne's name has been established by his high school. Contributions can be sent to Jeannette Marchant, Webster High School, 800 Five Mile Line Road, Webster, NY 14580. — JB

About Reese's Piece

In reference to "On the Horizon" at the end of "Modems: 9,600 bps and Counting" (January '90), I disagree with Reese Jones' conclusion that broadband ISDN (Integrated Digital Services Network) "won't become widely available until the next millennium." Broadband ISDN should start being available, at least in Western Europe and Japan, by 1995.

The '90s will be the communications decade and especially the decade of "image communications." I am convinced that — even though some in the U.S. joke about ISDN's being the initials for *I Still Don't Know* — the marketplace is becoming a single worldwide entity. If the United States lags in implementing a nationwide ISDN structure compared with the other two world economic centers, the Far East and Western Europe, the consequences could be dramatic.

Jacques Kauffmann
Wilmette, IL



We common folk will welcome the next millenium in the year 2000 — chronometric nitpickers must wait until 2001. In either case, we'll be very surprised if broadband ISDN spreads throughout the U.S. communications system before the millenial champagne starts to pour. — RM

Optional Error

Thank you for printing my letter "Overlooked Options" (January '90). I was astonished to open the magazine and find my missive there — but I was astounded when I read it!

The Word 4 keystrokes I described were (keypad) Command-9 for Top of Document and Command-3 for End of Document. You printed these as Option-9 and Option-3, which do nothing but beep. Just imagine all the users who'll try them, fail, and consider me a witless nerd.

To quote one of your own Dialog Boxes of the Month, you could "Click OK if you're very, very ashamed."

Richard Theriault
Clearwater, FL

OK. — JB

Keys to Remember

Not only can you use the numeric keypad to run around within your document, as mentioned by Richard Theriault,

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LETTERS

but you can use Word 4's Commands option (on the Edit menu) to make the Home key take you to the top of the document and the End key take you to the bottom.

What bugs me is the number of commands that are available in Word that most people (myself included) don't know about. One keystroke combination in particular places the cursor right at the bottom of the screen where the style name is referenced and allows you to input an existing style for the marked section. I discovered the keystroke by accident; now I can't remember where it is!

Mark Beale
Santa Clara, CA

Try Command-Shift-S. Or was that Option-Shift-S? — JZ

Clean Bill of Health

In your review of Microseeds' Redux (July '89), you wrote that version 1.5 contained a bug that Microseeds was trying to fix. I have not seen a comment that it has been fixed (I could have missed it), and I have not seen a higher-order version of the application shown in the mail-order-house listings.

Has the glitch been fixed? I'm interested in getting the application, but since I am relatively new to this game, I don't need built-in bugs. I can screw up often enough without outside help.

Stuart D. Holland
Madison, CN

Microseeds has apparently solved the bug we noted last July. The problem occurred when you tried to update a backup set, created with an earlier version of Redux, using Redux 1.5. If you're using only the latest version of Redux, you shouldn't have any problems. Redux version 1.6, which should be out by the time you read this, should have the bug fixed completely. — RI



Special Delivery . . .

. . . Remember those folksy commercials in which garment workers urged us in song to "look for the union label"? When it comes to the **Apple label,** no one seems willing to look very far. "I'm working on my SE/30," says Stephen Leigh of Cincinnati, Ohio. "My keyboard is a Data Desk, my screen is a Radius Full-Page Display, my modem is from Practical Peripherals, and I'm moving the cursor with a Kensington Turbo Mouse. I'll be printing on an ImageWriter, but I've been looking seriously at the Hewlett-Packard DeskWriter. My internal hard-disk drive *is* Apple's, but that's only because I bought my SE/30 used, otherwise . . . need I say more?"

Another used-Mac owner, Larry Nelson of Santa Monica, California, claims that "until Apple becomes less arrogant and starts dealing with people, I will bypass them whenever possible." Larry has a third-party modem, printer, hard drive, and keyboard. He gets his software either directly from the manufacturers or from mail-order discounters. "If it weren't for the user groups, the Mac wouldn't be anywhere," he asserts. "I can't get even simple questions answered by a dealer."

Michael J. Kobb of Cambridge, Massachusetts, bought a IIx "because there's no such thing as an Apple clone and with an educational discount it was actually no more than double a reasonable price." The rest of his setup (except for Apple's RGB monitor) is third-party. "All the third-party equipment has at least four times the warranty of Apple's equipment, and the La Cie hard-disk drive has 20 times the warranty!"

Speak Up:

It's long been a maxim that over time the cost of electronic components decreases. Consequently, those who are willing to wait for prices to drop (and perhaps accept less-than-cutting-edge performance) can save a bundle. Already, in the Mac market, peripherals once considered luxuries (such as hard-disk drives and laser printers) are becoming standard equipment even for single users.

What peripheral are you waiting to buy until the price is right?

Send your thoughts to Special Delivery, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

More Rave Reviews for the #1 SQL Database.

PC WEEK

Oracle for Mac Solves DBMS Puzzle

SQL/HyperCard Combo Produces Sophisticated Applications

By Susan Janus

Database giant Oracle Corp., of Belmont, Calif., recently rounded out the list of platforms supported by the company's relational database-management system (DBMS) with the release of Oracle for Macintosh.

The new Mac DBMS teams the power of Oracle's Structured Query Language (SQL) with HyperCard's customizable and easy-to-use interface.

This combination allows Mac developers to create sophisticated applications that appear simple to users—a unique software-development opportunity unavailable on any other platform, including the PC, according to early corporate users we contacted.

In addition, users said, the network version of Oracle for the Mac allows the advantages of the HyperCard interface to serve as a front end to existing corporate relational databases residing on other platforms, such as mainframes and minicomputers.

Consequently, the Mac software has great potential for s...

oping database-manageme... systems to connect departmental Macs to larger systems. Jeff Menz, a systems analyst for a scientific R and D organization, is currently using Oracle for Macintosh to develop a system that will give the company's numerous Mac users access to an Oracle database running on a VAX. Using the networking version, Menz will link departmental AppleTalk networks to the VAX over a TCP/IP network.

Oracle Provides the Groundwork

The key benefit of Oracle's product is that "all the fundamental technical work—the protocols, the compatibility with the AppleTalk network—has been done by Oracle," Menz said. "I just have to build the HyperCard interface and do the database design work."

The result will be an Oracle relational database application on the VAX with a HyperCard front end that Mac users feel comfortable with, he explained. Also, the company will have one logical relational database instead of numerous fragmented local databases. This allows tighter security, improved data integrity and better performance, he added.

Oracle for Macintosh

DBMS Brings New Power and Face to Mac Application Development

WHAT CORPORATE BUYERS LIKE

- Offers SQL capabilities
- Uses HyperCard to mask complexity of database applications
- Serves as front end to relational databases on other platforms
- Can link different Oracle database platforms with network version
- Provides good documentation and support

"ORACLE for Macintosh is a well-designed product...a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes—honest." ★★★★

MacUser, June 1989

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MacWeek, March 14, 1989

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MacGuide Magazine, June 1989

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LETTERS

CPU Envy

As I sit typing on my new Macintosh IIcx, I'm finding (thanks to my subscription) that a new "black box" — the Macintosh IIci — is faster and more "high-tech" than the off-white box I purchased a stone's throw from the city of Cupertino.

I'm a somewhat-affluent consumer able to plunk down the $7,000 for a computer system incorporating a color monitor and a dot-matrix Apple printer. And here I thought I was purchasing state-of-the-art equipment.

Oh sure, another surly letter from some ignorant computer idiot — only there are more like me in the land of potential buyers, people who *do* possess the capability to purchase an expensive setup *outright*. And I can tell you this will be my *last* Apple computer if Apple continues on its path of planned one-upmanship. I certainly didn't spend more for a computer than I did for my car in order to watch it become obsolete overnight.

Mark R. Alley
Sacramento, CA

Remember, your car became obsolete within a year, while your IIcx can be upgraded to a IIci. On the other hand, do you really need *a IIci? Pan Am isn't planning to swap its jumbo jets for stealth bombers — even though the latter are presumably more "high-tech."* — SP

Spell It Out

As a reader of *MacUser* and a user of a Mac, I appreciate all that you are doing to keep us happy and informed. However, many of us are not programmers and do not instantly recognize and understand the meaning of initials appearing out of nowhere in the midst of an article. Do you think your writers might put a translation of the initials they use somewhere in the article, at least once, for those of us who love to use the Mac, but never learned the basic language?

J.L. Scott
Omaha, NE

FYI (for your information), our CCE (chief copy editor) insists that we spell out most acronyms OFM (on first mention). For the benefit of incipient power users, though, here is a pocket reference you can use to decipher the 12 most common Mac acronyms. — JB

MacUser Clip 'n' Save Acronym Decoder (MCSAD)

ADB	**Apple Desktop Bus**
cdev	**Control Panel device**
DA	**desk accessory**
DIP	**dual in-line package**
DTP	**desktop publishing**
EPSF	**Encapsulated PostScript format**
HFS	**Hierarchical File System**
MIDI	**musical instrument digital interface**
SCSI	**small computer system interface**
SIMM	**single in-line memory module**
TIFF	**tag image file format**
WYSIWYG	**what you see is what you get**

City Likes

I'd like to alert K.C. Cowan (Letters, January '90) that the person with whom he or she spoke at Maxis Software must have been the one who was "out to lunch." I bought SimCity Supreme (the color Mac II version) a few weeks ago and was very glad to find that it came without copy protection. This version costs more, but it comes with a terrain editor, and the color graphics are fantastic. My only problem with the program is how slow it is once your city gets large enough to become a metropolis.

Gary Kowalski
Santa Ana, CA

Based on our metropolitan experiences, that sounds more like an added touch of realism. — JB

Non-PostScript Problems

In "Page-Layout Play-offs" (January '90) your "Features Comparison" table states that Letraset's Ready,Set,Go! 4.5a supports QuickDraw printers. This is not exactly correct. You can get output on a LaserWriter IISC but, for all intents and purposes, it's worthless. The program doesn't support kerning, tracking, or letterspacing in whole- or partial-point increments. When you attempt to invoke precision typographic control, the program balks, the character spacing is unaffected, and formatting such as centering

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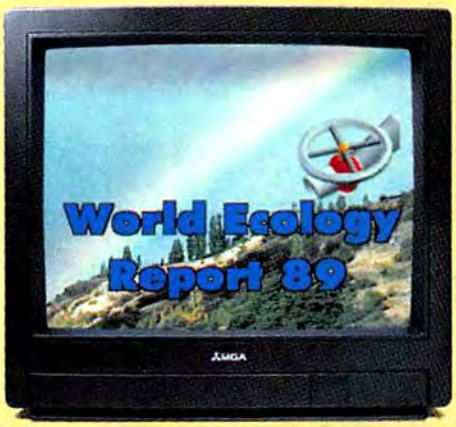
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The New York Times

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LETTERS

or justification is lost.

Ronald A. Graham
Salem, OR

Manufacturers' claims, and your expectations, should always undergo reality checks when dealing with non-PostScript printers (at least for now). With a IISC, without PostScript, you give up not only fine kerning and letterspacing but also other special visual and typographical effects. You're at the mercy of your application and the printer's driving software to provide effects that PostScript-printer users take for granted. For the foreseeable future, you're bound to be in the "If it's not one thing, it's another" mode. You have at least two PostScript options: Upgrading your IISC to a II (which includes PostScript) or buying Freedom of Press software from Custom Applications International ([508] 667-8585), whose March '90 release supports the IISC, PLP II, and Type 1 fonts. — SP



Strong Words

Robert Virkus parenthetically adds in "Page-Layout Play-offs" (January '90) that text-editing abilities of the three page-layout programs are minimal. In PageMaker's case, that's true, but we bought QuarkXPress two and a half years ago in part because of its strong word-processing features.

As designers, we believe that PageMaker's pasteboard paradigm is overrated. Precision of control is what a professional wants, and in view of QuarkXPress' ease of use, there's little reason to put up with PageMaker's limitations anymore.

Kevin L. Martin
Chevy Chase, MD

...AGED CUSTOMER SEIZES ALIEN FLYING DISK AND BEATS COMPUTER SALESMAN SENSELESS.





Alleged cause of the bizarre attack: the Rival. A better-performing, less expensive display for Macintosh computers.

It was all too much for Gordon Lewis of Dishman, Washington. When, after paying nearly $2,100 for a large screen display for his new Macintosh computer, he read in an ad that he could have bought a better system for about $400 less, he flew into a rage, drove straight to Bob 'n' Brian's Computers 'n' Stuff., grabbed the nearest weapon, a 5-1/4" Flight Simulator floppy disk and proceeded to pummel his salesman into senselessness.



The weapon

Police were called to break up the scuffle, but Brian Girvins, Manager, declined to press charges: "We didn't know about the Rival ourselves, or we wouldn't have been pushing these expensive brands." He muttered.

"We owe Gordon a debt of thanks for bringing the Rival to our attention. Although we wish he'd just called and told us on the phone."

"These computer users are a feisty bunch," Police Chief Aldo Malmstein said." We've had a few of these cases lately, all stemming from customers overpaying for computer equipment and finding out later how much they could have saved."

Keep your name out of the papers.

You have a right to be mad if you pay too much for a big screen display. But a no-name, budget system isn't the answer, either.

Introducing the MegaScreen Rival dual-page 19" black and white display. Superior performance at a price far below that of our major competitors.

Rival is the latest version of the MegaScreen **rated Number One** by Macworld, May '89. Its 1024 x 826 resolution at 75 dpi is flicker-free, thanks to 75Hz performance. And the image is bright and clear on the high-quality Zenith monitor. Rival comes complete with a built-in tilt-and-swivel base, cable and controller.

There are versions for the SE, SE/30 and Mac II family–at hundreds of dollars below our major competitors.

Here's what Rival owners have to say:

"It's crisp and clear and easy on the eyes– that's important when you end up working at it for 10 to 12 hours straight. I really don't know how I got along without it."

– Carol Stieglitz, Graphic Designer

"Our Rival is great. The price nabbed us. We shopped around, and it was far and away the best value."

– Shannon de Herrera, Publisher

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Call us at (800) 423-0183 (within California, call (805) 484-3799) to find out where you can buy the MegaScreen Rival from MegaGraphics.

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Unsurpassed Password Protection

Now the leader in hard disk security announces the ultimate data protection system for your Macintosh. **DiskLock** works with any SCSI hard disk to provide foolproof password protection for individual files, folders, or your entire hard disk. You can even protect *all three levels* with different passwords for absolute maximum security. **DiskLock** automatically locks your files when you shut down or leave your Mac unattended, and alerts you to any unauthorized access attempts.

Sophisticated Data Encryption

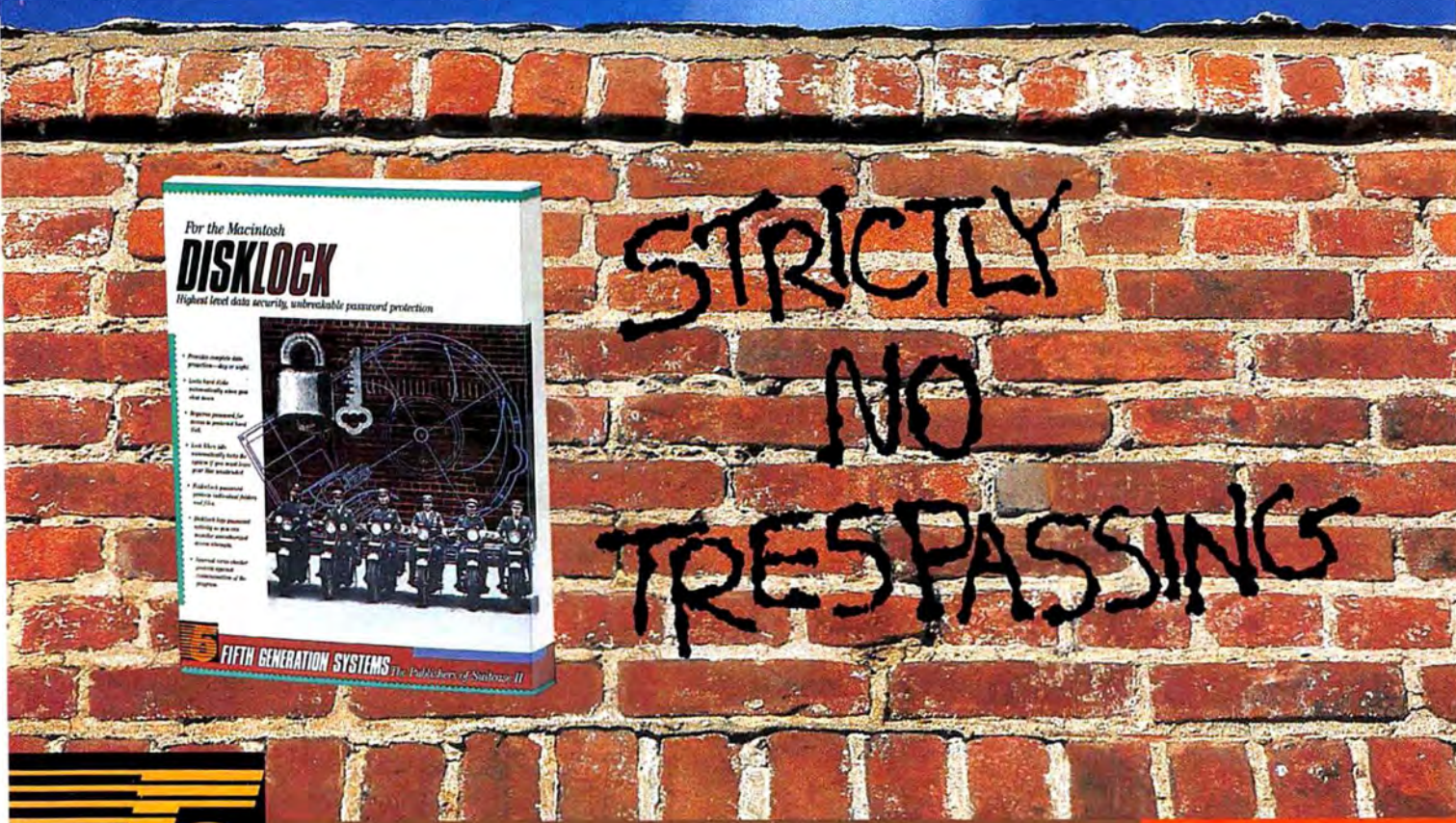
State-of-the-art data encryption adds yet another layer of security. Without the proper password, your confidential files appear to contain nothing but gobbledygook!

Multiple Security Levels.

DiskLock lets you give each user password access to *just the files you choose* (word processing files for your secretary, accounting files for your bookkeeper, etc.). The *master* password gives you access to all files and folders.

Virus Protection, too!

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LETTERS

Ready, Set, Get Even

In "Page-Layout Playoffs" (January '90), you conclude that Ready,Set,Go! "doesn't afford you the graphics, text, and layout capabilities of the other two programs," and yet in the features-comparison table, RSG boasts many more capabilities than PageMaker and at least as many as QuarkXPress.

What's my gripe really? Letraset apparently has gotten fed up with such reviews and has gone and created another whole program, adding a whopping price tag to convince you it's high-end. They're even charging us faithful RSG users more than $300 to upgrade. Thanks, guys, you've cost me a bundle.

Jon Marken
Hampden-Sydney, VA

Another Sick Dvorak Fan

In his October column, John C. Dvorak reported that he was "nearly nauseous." Actually, Mr. Dvorak is often nauseous, since he often makes people sick.

As Mrs. Kaiser told us in the fifth grade, "when you're nauseated, you feel sick. When you're nauseous, you make others sick."

Unfortunately, I nearly always find myself agreeing with Dvorak, which indicates that I'm probably as curmudgeonly as I appear.

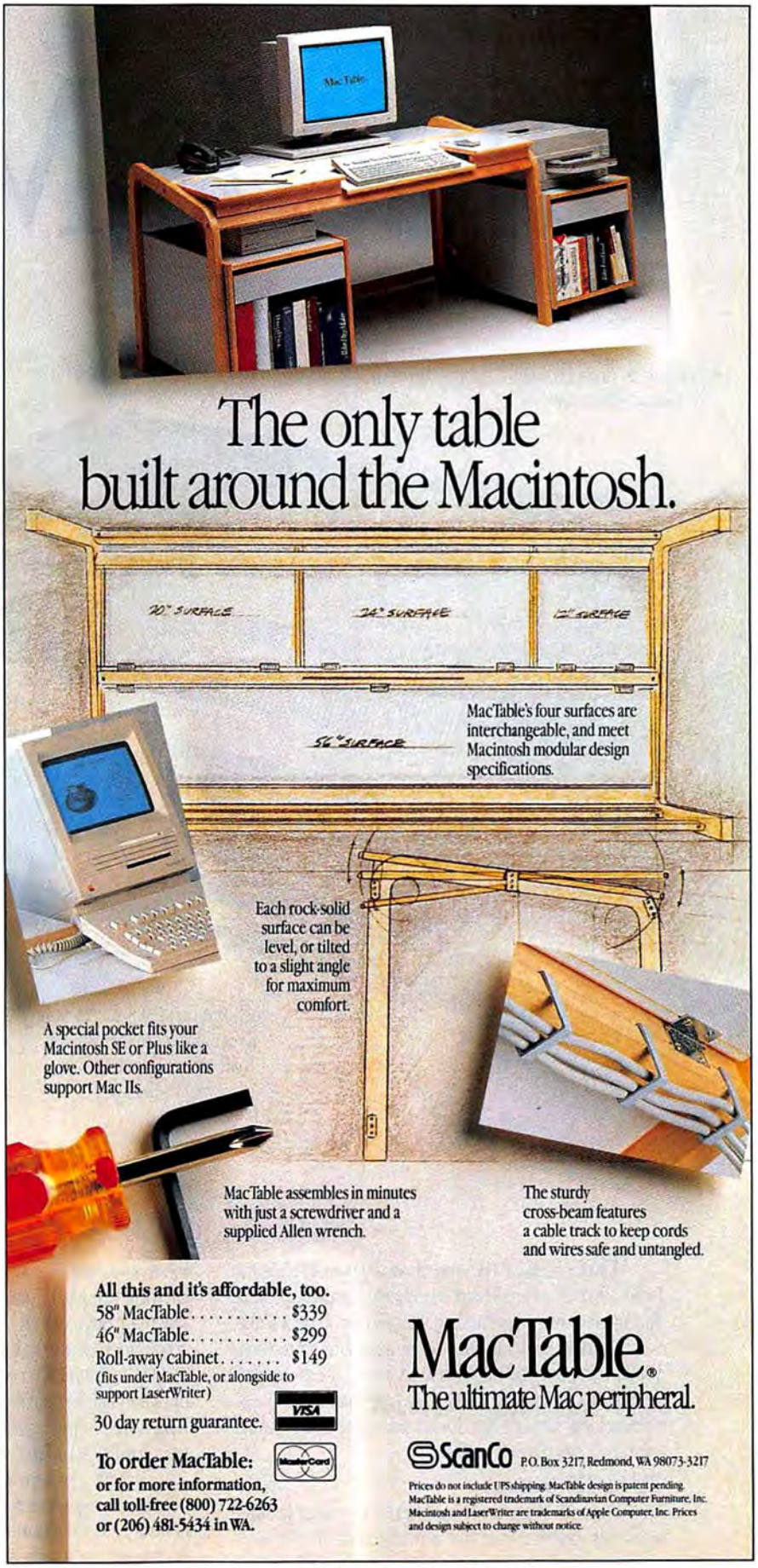
Ken Rice
Salt Lake City, UT

Good old Mrs. Kaiser — she should know. — JCD

CLARIFICATIONS

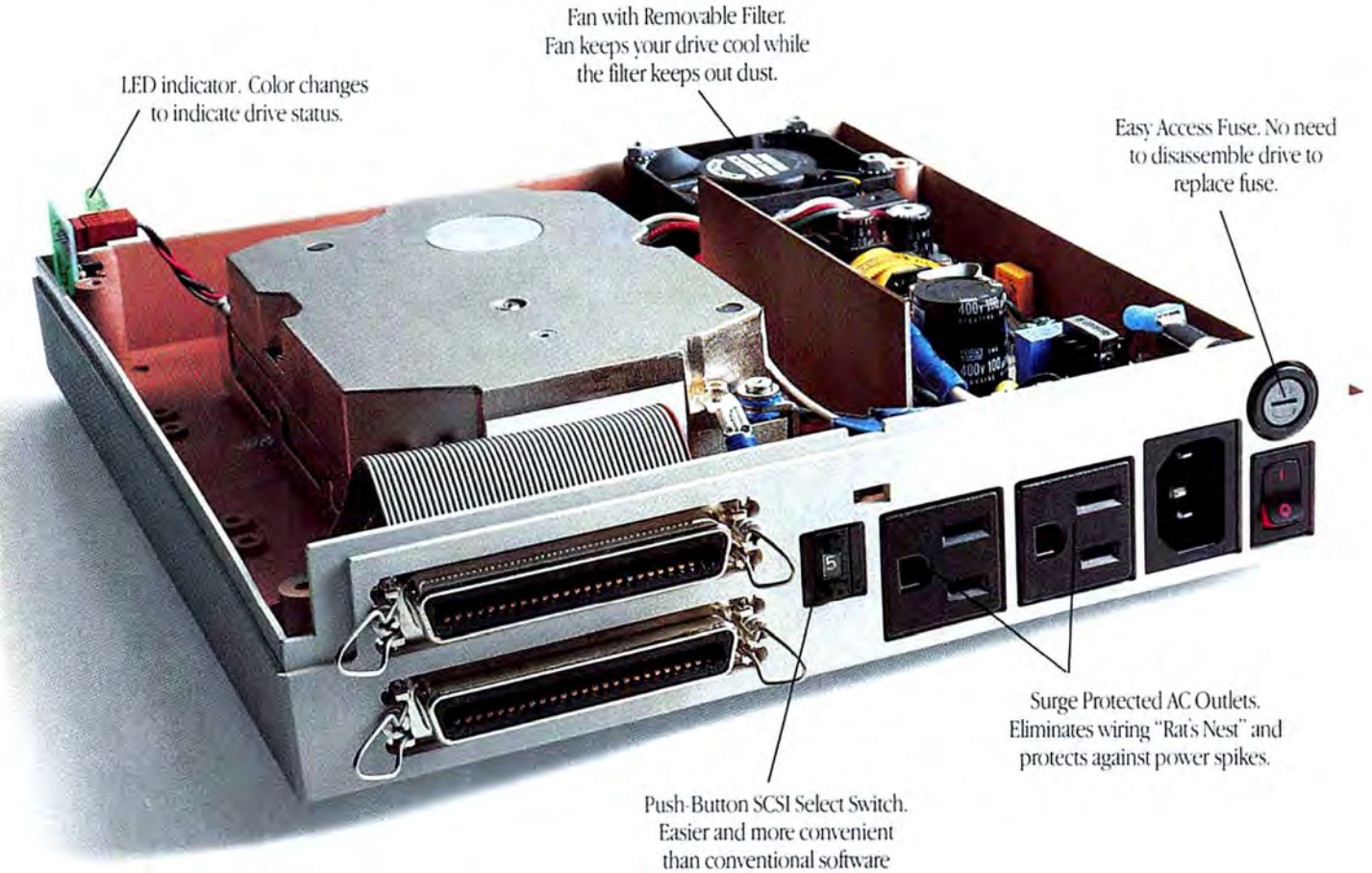
In "Page-Layout Play-offs" (January '90) RagTime's U.S. distributor was incorrectly listed. RagTime is distributed by RagTime USA, 400 Walnut St., Suite 501, Redwood City, CA 94063; (415) 780-1800.

"Charting a Course" (January '90) listed an old phone number for Action Software. The new number is (800) 826-0550. Also, the correct list price for TopDown 1.1a is $295. The price listed in the article is for the next version, 2.0.



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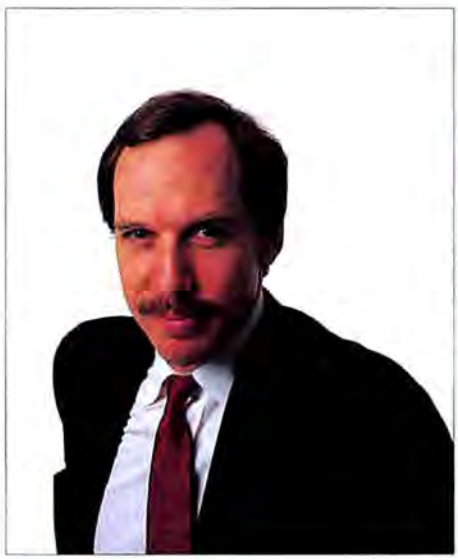
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PAUL
SOMERSON

Mac Crystal Gazing



By Paul Somerson

Divining the future is nothing new. Roman haruspices poked through entrails with pointed sticks. Over the years, others have thrown bones, drunk yage, consulted tarot cards, interpreted dreams.

Several of our editors recently did some public entrail-poking at the MacUser Marketing Conference, a popular annual event hosted by this magazine for the industry's top makers and shakers. Some of the highlights:

MacUser Labs Director Andrew Eisner started off by zeroing in on storage trends:

"High-end color DTP will generate enormous files. Typical 200-to-300K files of the past have already given way to TIFF files ten times that size, and single documents of 20 to 30 megabytes are around the corner. We'll need massive storage devices and far faster ways to move this data around.

"SCSI will give way to SCSI-2 and then to a super-high-speed fiber-optic-based bus. High-capacity removable media will ease the burden, along with DAT and ICI's Digital Paper, which may bring storage cost down to less than a dollar per gigabyte. While high-speed V.42 modems will push big files through telephone lines, we'll eventually rely on ISDN, fiber optics, and satellites."

Senior Editor Aileen Abernathy drew a bead on DTP in the 1990s:

"The page-layout world will segment into high-end, low-end, and specialized applications. High-end players such as QuarkXPress, PageMaker, and DesignStudio will continue their features war. This will benefit the sophisticated prepress market, but more-mainstream users will be left behind. Smart high-end vendors will tweak previous versions and remarket them as low-end applications. Programs such as Springboard Publisher, Publish It!, and Personal Press (if it ever sees the light of day following Aldus' pending acquisition of Silicon Beach Software) will fill the growing need for low-end basic functionality. Legions of desktop publishers are still producing newsletters and magazines in black-and-white and printing with laser printers. They don't need color separations and prepress links. More new products will be aimed at specialized markets such as advertising and database publishing.

"Groupware will discover desktop publishing. One user will be able to design a page while another is editing a text block on that page.

"Desktop color — for proofing and for final output — will finally achieve respectability. Software, scanners, and printers will provide quality indistinguishable from that obtained by traditional means. Vendors will come closer to achieving WYSIWYG color between display and output. Barco, Radius, and Tektronix are leading the way, and others will follow in their footsteps. Color scanners will plummet in price, following Microtek's lead. Dye-sublimation printers may be the wave of the future. This technology, spearheaded by Kodak and DuPont, offers output almost identical to traditional photographic prints.

"Font vendors will finally settle on a standard — PostScript Type 1 — and users will be able to choose freely from the fonts of many companies. We'll be able to use any company's fonts in any program and send output to any device, whether it's Adobe-sanctioned PostScript or a clone.

"Type as a *design* element will be exploited. TypeStyler, LetraStudio, and TypeAlign are the vanguard of a wave of new type-manipulation programs that will let desktop designers mimic the artistry of traditional typesetters. Thanks to the font hype, the typeface awareness of the average user will increase.

"Desktop resolution will rise from the current 300-dpi standard to 400, 600, or more — led by the LaserMax 1000. The gray-scale market has matured. New hardware and retouching applications will be me-too products. But the presentation market may find new life, thanks to the influx of new charting packages such as DeltaGraph and FoxGraph, and color LCD panels such as the one from In Focus Systems."

MacUser NetWorkShop Director Henry Bortman focused on connectivity:

"The '90s will be the decade of The Network. More computers will be connected together, and more work will be done across networks. When you use your computer at home, you'll plug into the same GlobalNet as at the office. When you travel, you'll connect to the GlobalNet terminal in your hotel room. From your car, you'll work on-line with a MobileModem.

"Tomorrow's computing environment will be highly distributed. When you run a program, different parts of it will run on different machines, each with its own special abilities, each contributing its partial 'results' to the overall result. A computer's ability to communicate with other types of computers — to share data, graphics, and even application modules and human interfaces — will become critical. Apple and its third-party developers will continue to pay more attention to the importance of connecting to other types of computers than any other CPU vendor."

In the '90s — the decade of The Network — you'll access the same GlobalNet from your office, home, hotel, or car.

Executive Editor Jon Zilber

brought down the house with a tongue-in-cheek overview of how the '80s lived up to predictions made a decade ago. He also listed a few mostly serious prognostications for the '90s:

"More and more software companies will follow the example set by Claris, DataViz, Quark, and Informix by cross-licensing pieces of code to each other. Software will eventually be purchased à la carte, with customers buying just the features, functions, and options they need, and mixing and matching from different vendors to create custom software.

"Apple will broaden its CPU line with lower- and higher-end models. Fiber-optic and ISDN ports will be standard on all Macs, and speech recognition will be built into ROM in the higher-end models.

"While it may have looked a few years ago like Wang could devour Apple, the reverse may actually happen. Early in the '90s, Apple will repel an unsuccessful takeover bid by Sony. In fact, as the millennium approaches, Apple will acquire the ailing Sony media empire.

"Finally, by the end of the '90s, Apple will remedy its inadequate 90-day warranty, right around the time Ted Turner enters the hardware market with an add-in to colorize vintage Mac Pluses."

Some augury of my own: By the middle of the decade, monochrome will finally be history. Even low-end systems will be packed to the gills with multiple processors. Voice and sound will play a surprisingly important role at all levels of systems. High-resolution color flat-panel displays will start edging out bulky, old-fashioned monitors.

Apple will come out with a super-friendly, affordable, low-end system aimed at schools — and this will serendipitously become the first real home computer. Every executive will find a way to justify spending far too much for the hot, new, tiny, voice-recognition-based Mac pocket scheduler. We'll see even more so-called standards slugging it out on the IBM side than there are now.

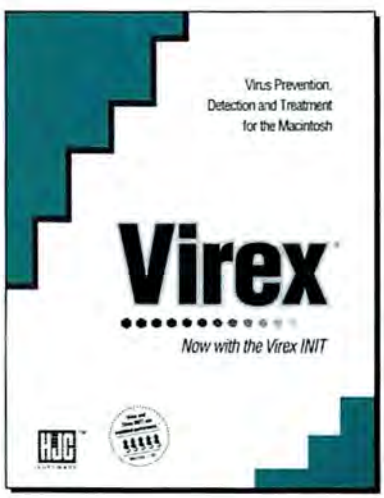
In a dramatic turnaround, as it watches IBM operating systems blatantly pirate the Mac interface, Apple will differentiate itself from the pack by becoming known as *the* user-support computer company.

To compete at all, every application-software package will need to have some form of expert system built in. And instead of buying another Cray when the current one becomes obsolete, Apple will wise up and just buy Cray — lock, stock, and gigabarrel. Finally, as superrealistic graphics and high-speed processors take hold and the oddly named "virtual reality" *becomes* a reality, the entertainment-software market will explode.

What are your predictions? Drop us a line, and let us know.

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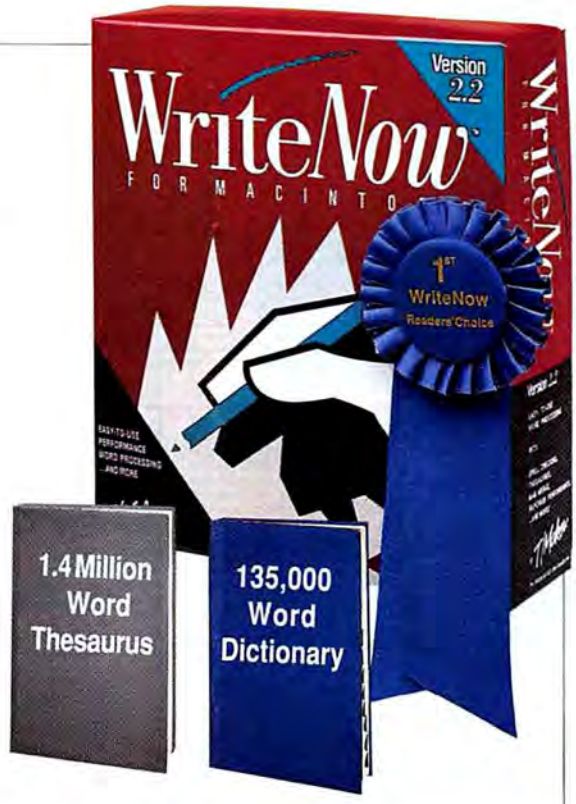
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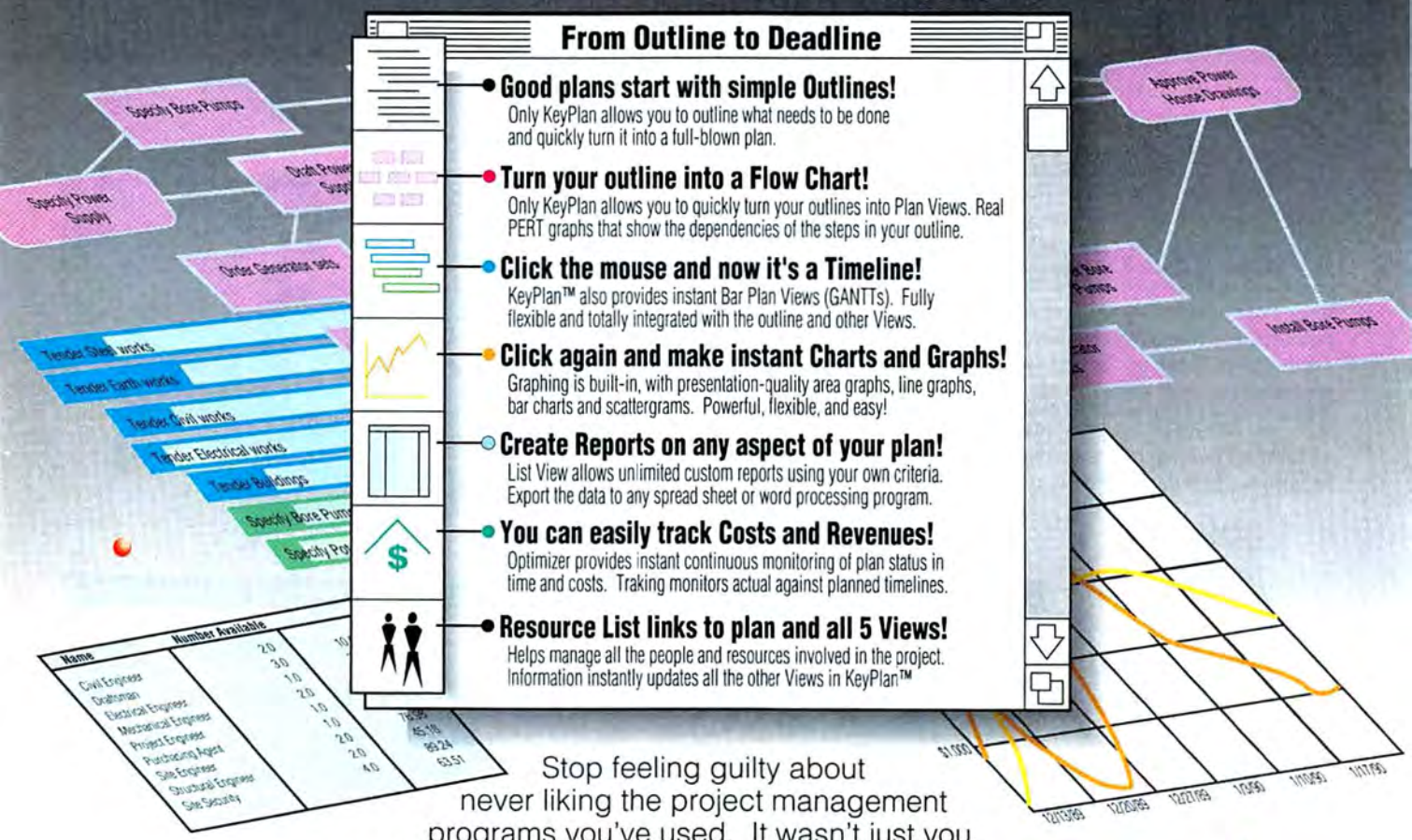
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ROBERT R.
WIGGINS



Creative Cost Cutting

When the Mac was young, it was virtually impossible to get one into a business environment. Management had hundreds of objections and dozens of reasons to prefer MS-DOS machines. *MacUser* ran articles and columns with strategies for overcoming management's objections to the Mac. People who did successfully install Macs in corporate-America offices were lionized in the Mac community — of such stuff were legends made.

The passing years have narrowed the gap between the Mac and the MS-DOS crowd. Slowly but surely, Apple has addressed all the major complaints —and legitimate objections — to the Mac by increasing memory, adding expansion slots and SCSI, allowing larger screens and color, boosting performance, and generally making the Mac not just an alternative to MS-DOS but the preferred choice of many. The other side even helped Apple by trying to make its products more Mac-like, which gave the Mac additional legitimacy in the corporate market.

But despite the efforts of Apple and others, one major objection to the Mac remains in the hearts and minds of corporate America: cost. The Mac still is an expensive alternative. Apple has yet to release a low-cost Mac, and some observers estimate that we may not see a low-priced color machine until 1991. On the MS-DOS side, competition among clones keeps their prices down. There are no Mac clones, however, and if Apple's lawyers get their way, there never will be. If you want a Mac, you have to pay Apple whatever it wants.

But Apple's monopoly on the Mac doesn't necessarily mean you can't afford one. By taking some extra time to investigate all your alternatives, you may find you can substantially reduce the required outlay to get that state-of-the-art machine you've been lusting after but that the boss says won't fit in the budget. Here are some simple rules to follow on your road to the best deal.

1. Don't buy Apple-brand unless you have to. You have to buy the CPUs from Apple, but you can save a lot of money if you buy everything else somewhere else. A ridiculously high percentage of Mac SEs and Mac IIs are sold with internal hard disks and extra memory — with Apple's high markup. If you look around, you'll find that there are dozens of companies selling memory and hard disks for a fraction of Apple's prices. For example, a Mac IIci loaded with 4 megabytes of memory and an 80-megabyte hard drive — both from Apple — costs $2,400 more than the stripped model. At the end of 1989, you could buy additional memory from non-Apple companies for less than $400 for 4 megabytes, and non-Apple 80-megabyte hard-drive prices were as low as $800. Even if you had to pay a dealer $200 for installation, you could save $1,000. You can achieve similar savings on printers (although the LaserWriter NTX is a great printer, so you may still want to go Apple for that), AppleTalk connectors (check out PhoneNet), monitors, and almost anything else Apple sells.

When buying from companies other than Apple, you can not only save money up front, but you may also save money in the long run since these companies offer longer warranties. As it enters 1990, Apple still offers only a woefully inadequate 90-day warranty. Most other manufacturers offer a minimum of one year — and some offer as much as five years. Consequently, if there are problems covered under warranty that don't show up until after the first 90 days, you're better off with non-Apple equipment anyway.

2. If you do have to buy Apple, see if you qualify for any discounts. Apple has many special programs that offer substantial discounts on equipment if you qualify — and that's a big if. Large corporate customers sometimes receive volume-purchase discounts. Even if you're buying through a dealer, you may qualify for corporate discounts; find out if your company has an agreement with a local dealer. Sales promotions, such as the one at the end of 1989 that let you defer payment until 1990, offer slight discounts. If you're acquiring Macs in order to develop software, you may qualify for Apple's Partner program for software developers. In the educational market, Apple has special deals with some colleges and universities (collectively called the Apple University Consortium), and if you're a student or faculty member at one of these schools, you qualify for hefty discounts.

3. Shop around at other sources, including mail-order houses. Whether you're buying Apple computers or non-Apple equipment or software, it pays to shop around. Different dealers may have different prices or different attitudes toward haggling. Check the ads for the mail-order

By investigating all your alternatives, you may find you can spend less and still get the Mac you've been lusting after.



By Robert R. Wiggins

ILLUSTRATION JENNIE OPPENHEIMER

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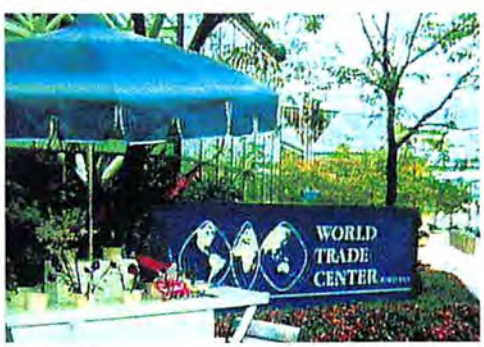
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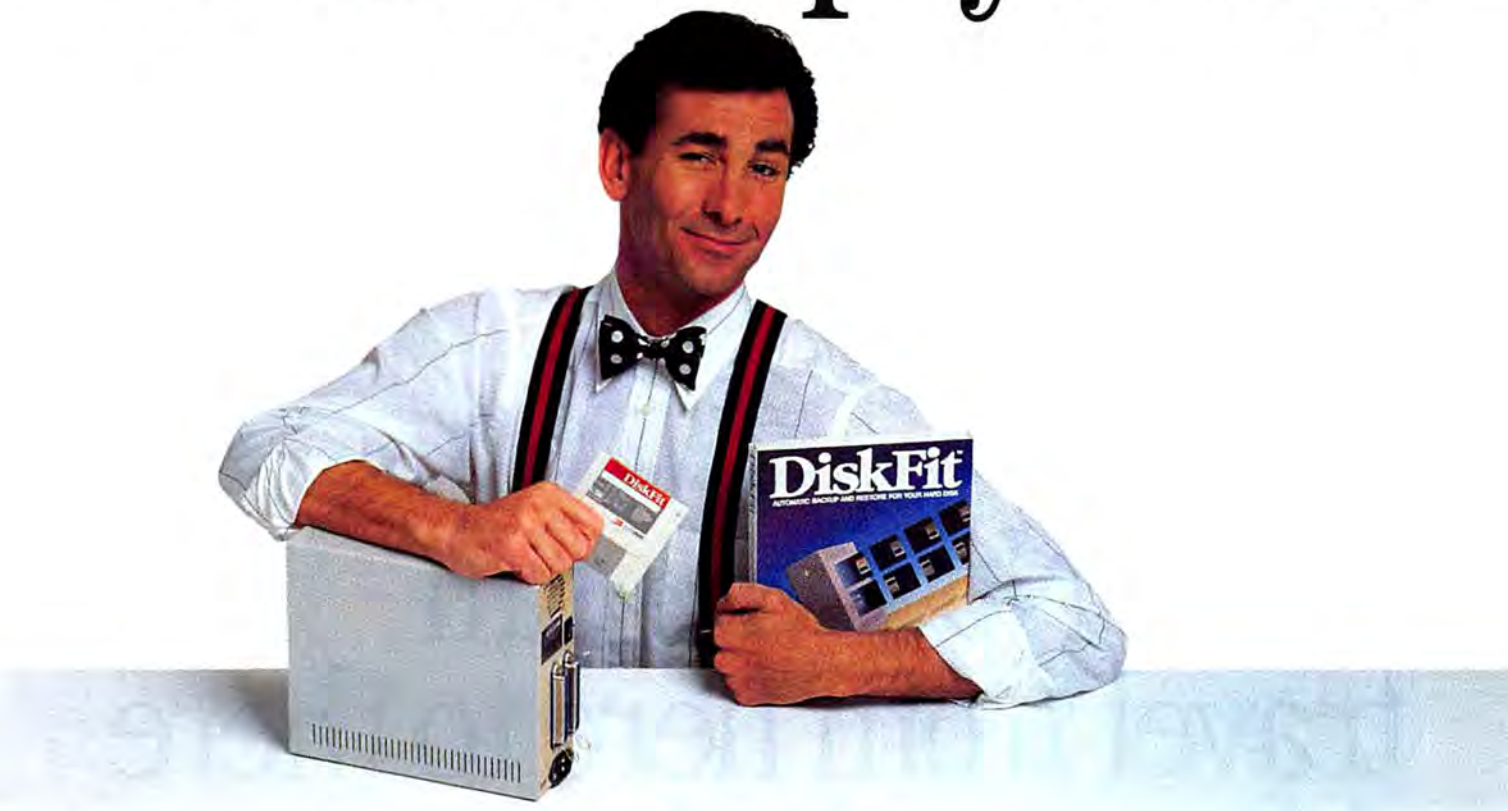
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houses right here in *MacUser* to get an idea about prices — you may be able to get a local dealer to narrow the gap if you're armed with information about a lower price. If not, go ahead and order through the mail. Most of the Mac mail-order houses offer overnight delivery, so if your dealer doesn't have an item in stock, it's probably faster to mail-order it anyway — and it's almost certain to be cheaper. You might want to stick with the majors (the ones with the multipage ads) at first, but if you're brave, you can try some of the smaller outfits that specialize in things like memory (SIMMs).

4. Investigate corporate clout, volume discounts, and site licensing. Even if you're not dealing with Apple equipment (and are therefore restricted to Apple authorized dealers), it's never a waste of time to find out if your company has any arrangements with any dealers or vendors of other types of equipment. You might find that your company's MS-DOS purchases entitle you to discounts on Mac products as well. Ask your central support group (if you have one for PCs), or track down your company's purchasing agent responsible for computer equipment, and find out what clout your company has with which vendors or dealers. If your company is converting to the Macintosh in a big way, investigate volume discounts on hardware. And don't forget about software. Some companies offer volume discounts on software, and others offer site licensing for substantial savings.

So although Apple holds the monopoly on Macs, there's no reason to give it more than its fair share of your computing dollars. Buy your Macs stripped, without hard disks and with no extras (especially memory, Apple's highest-markup item). Avoid Apple peripherals if you can find their equivalents elsewhere for less. Shop around for the best prices, and be sure to take advantage of any discounts you qualify for. If your company doesn't already have deals for volume discounts or site licensing, see if you can negotiate some. With all the money you save, you may be able to afford a IIci instead of an SE/30, or an SE/30 instead of a Plus. Save a thousand dollars here and a thousand dollars there, and pretty soon you're talking about real money.

Larry's DiskFit Breaks Murphy's Law.



Before everything that can go wrong does go wrong, Larry does it right. He backs up everything on his hard disk with SuperMac's DiskFit®—the most popular, easy-to-use backup utility in the Macintosh® universe.

DiskFit doesn't just create an ordinary backup, it creates a compact, indexed SmartSet™ in Finder-readable format for the fastest and easiest file location and recovery. Its fast incremental backup feature updates only new or changed files within your SmartSet—a full day's worth of changes from start to finish in just 3 minutes. And DiskFit reclaims space better than any other backup program, keeping your SmartSet as small and as easy to manage as possible.

So feel free to violate Murphy's Law, and do the right thing. Keep every bit of your data safe with DiskFit.

Call **(408)773-4498** today for the name of your nearest SuperMac dealer.

SUPERMAC TECHNOLOGY

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Now you can travel from here to there with twice the horsepower.

Getting from your Macintosh to virtually any fax machine in the world is now a lot faster.

Because the new 9600-bps Abaton InterFax™ 24/96 gets your message across twice as fast as before. Twice as fast as when MacWEEK rated the original InterFax the fastest fax/modem for the Mac. And since the InterFax software compresses the file before sending it out, you spend even less time transmitting than with any other 9600-bps fax/modem.

But we didn't just double the raw output speed, we made it easier to use. We included direct scan support, so you can fax art and photos straight from the scanner with excellent resolution. We also made the software easier to use — it's as simple as printing to any printer. And we made the InterFax work in background (with or without Multifinder™), so you can get back to work while your Mac faxes. You can even schedule when faxes are sent to take advantage of lower phone rates.

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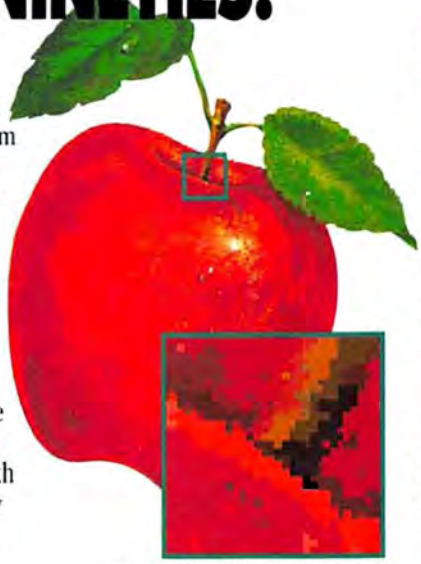
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At last. A next-generation entry level graphics program that doesn't limit its users to entry level performance. Or entry level results.

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Run it on a MacPlus and SE, and experience the ultimate in high resolution black & white painting, with the help of just about every tool you can imagine. And then some.

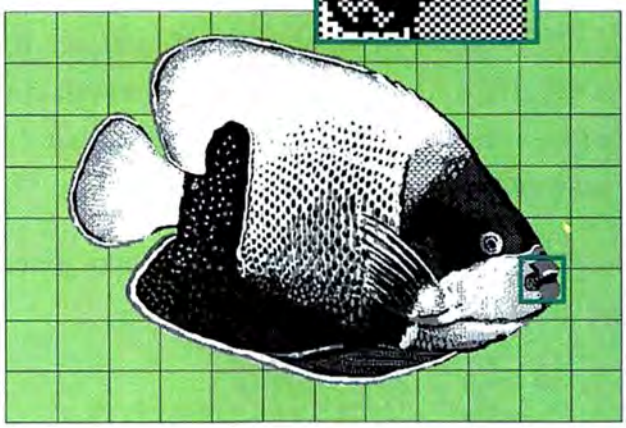
Add depth to your compositions, using a complete set of advanced drawing tools to create up to 8 independent object-oriented layers.

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B&W PAINTING Work with all the traditional painting tools, plus 72-600 dpi precision and sophisticated features like a true-to-life airbrush, flexible masking, and lightening/darkening filters. Keep your tools all on their own layer, if you wish.







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Or open UltraPaint up on a Mac II and watch it come alive with millions of colors and enough grey scale editing power to retouch, combine, or totally recreate images captured by any scanner.

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QUALITY TIME

You Have Better Things To Do Than Back Up

If you can think of better ways to spend your time than backing up your hard disk, you need Fastback II. It's the world's fastest and most reliable backup software for the Macintosh. It's also the easiest to use, with simplified file selection, adaptable data compression, advanced error correction and other features to make your backups fast and foolproof.

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ILLUSTRATION GREG CLARKE

GUY
KAWASAKI

barbershop quartets, and models — unless, of course, you enjoy having your intelligence insulted. If you're pressed for time, here's a quick analysis of the booths not to miss:

Apple. Tiny companies with very innovative products often exhibit in the Apple booth. Usually these companies aren't anywhere else in the show. On the other hand, the unavoidable yet-another HyperCard stacks and *Popular Science*-induced videos can ruin your whole day.

Claris. The Claris booth staff is typically friendly and informative because it comprises product managers, tech-support engineers, and trainers. This is especially true at the San Francisco show because it's close to Claris' headquarters in Santa Clara. Also, they have nice carrying bags. [*And what are* our *bags — chopped liver? — Ed.*]

Microsoft. The Microsoft booth is interesting to visit if only to see how Microsoft is trying to crush its competitors — by issuing vaporous preannouncements to negate a competitor's shipping product, for example. The Microsoft booth always provides a great lesson in guerilla marketing.

Silicon Beach, CE Software, and Qualitas Trading. Silicon Beach people are extraordinarily friendly, and their Aloha shirts make me homesick for Hawaii. CE people love to do demos. If they really like you, they might even send you some incredible Iowa pork chops. Qualitas is the cool Japanese company with the cool Japanese clip art and cool calligraphy software.

Fair Trade Laws

The goal of this column is help you get the most out of the April 1990 Macworld Expo in San Francisco (or any other Macintosh show). It represents the knowledge I've gained by attending or exhibiting at every Macworld Expo except one. (I missed the August 1986 Expo because it conflicted with my wedding, and I couldn't convince either the show promoter, Mitch Hall, or my wife-to-be to change the dates.)

Industry-Day Power Plays

Industry day is the day before Macworld Expo opens to the public. In theory it is for Very Important Pessimists to coolly and calmly walk the floor. In reality, it gives software vendors one more day to figure out why their new version is crashing and to train new employees: "Trixie and Biff, this is a mouse. The ball goes on the bottom and the button on the top."

Industry day is a farce because almost anyone can get a pass. All you have to do is appeal to the greed, competitiveness, and paranoia of vendors. Call a vendor and say, "I'm from Boeing (or any other Fortune 1,000 company). I'm responsible for the selection of Mac software and would like to discuss standardizing on your product. Is industry day a good day for you?"

It helps if you really are from Boeing or a Fortune 1,000 company. If you aren't, saying that you're a consultant to one of these companies is good enough. Ask the vendor to send you a badge (vendors get an allotment of them), and after it comes, call and cancel the meeting. If you feel guilty, tell the vendor you'll come to its booth. Whether you actually go is up to you. Most vendors won't remember the conversation anyway.

On the Floor

I recommend the minesweeper approach to seeing the show: going up and down every aisle to see every vendor's booth. The only booths you should skip are the ones with skits,

How to Get Free Stuff

At some point you're going to have to justify your trip to your company or spouse. The best way is to get free stuff. Free stuff can range from Wingz bags that break in ten minutes [*Two years and counting on mine. — Ed.*] to product samples. I'll assume that you want to concentrate on the latter.

As with getting industry-day passes, you simply need to appeal to the greed, competitiveness, and paranoia of vendors to get free samples. The key is to believe in your heart that you are doing the vendor a favor. A list of the ploys that always worked on me follow.

1. *I'm a reviewer for* MacUser.

At some point you're going to have to justify your trip. The best way is to get free stuff.



By Guy Kawasaki

OMNIS 5



Look Again!

Yes, look at OMNIS 5 from Blyth Software. Omnis 5 is the only database that produces identical applications for Macintosh and IBM PC's or compatibles! You pick the development platform, your Omnis 5 application runs in both environments with the same easy graphic interface.

Today's business requires short learning curves and the high productivity of OMNIS 5. OMNIS 5's cross-platform compatibility simplifies support! One application serves all users on your mixed-platform network!

OMNIS 5 is the development platform of the 1990's!

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In the US 1-800-843-8615, or in
CA 1-800-223-8050 or 415-571-0222

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I'd like a copy of your software to review. Microsoft and Claris have already sent me copies of their products. [Um . . . We — and our lawyers — strongly discourage this practice; besides, it doesn't even work for *us* all the time. — Ed.]

2. *I'm the president (or librarian or newsletter editor) of the Mac user group in (city). I'd like a copy of your software to review. Microsoft and Claris have already sent me copies of their product.*

3. *I'm responsible for the selection of software for my company. I'd like a copy of your software to review. Microsoft and Claris have already sent me copies of their product.*

4. *I'm a Macintosh consultant. I'm sick of recommending x (where x = a competitive product). I'd like a copy of your software to review. Microsoft and Claris have already sent me copies of their product.*

Desktop Partying

During Macworld Expo, there are wonderful parties throughout San Francisco. Their sole purpose is to impress competitors and to reduce corporate income taxes (i.e., waste money). The best places to try are the hotels that are close to the Moscone Convention Center, such as the Parker Meridien and Marriott.

It is your inalienable right to attend and enjoy as many of these parties as possible. After all, you've paid for them, and most vendors dread the prospect of an empty party.

There are three kinds of parties: the ones that start immediately after the show, the ones that start at 7:30 P.M., and the ones that start at 10:00 P.M. The first kind always has great buffets. The last kind always has great desserts and dancing. I recommend that you go to these.

The second kind, the 7:30 bashes, are not worth attending. They are usually stuffy, sit-down affairs filled with people who really don't want to be there. Some go out of corporate obligation. Some go out of boredom. Some go because their spouse made them.

There you have it — a guide to optimizing your Macworld Expo experience. I hope to see you on industry day carrying lots of free software in your Claris bag and looking well fed. I'll probably be at the Microsoft booth taking notes.

SOME DRAW, OTHERS REMEMBER

Aperture™ DOES BOTH

Visual Information Manager

We integrated two essential elements—diagrams and data. Now, at the same time as you are creating perfect, real dimensioned, fully scaled, visual representations of your projects, you're also adding your facts, figures, and thinking. Your applications and presentations will take on a whole new dimension.

Aperture's integrated database makes your drawings speak for themselves.

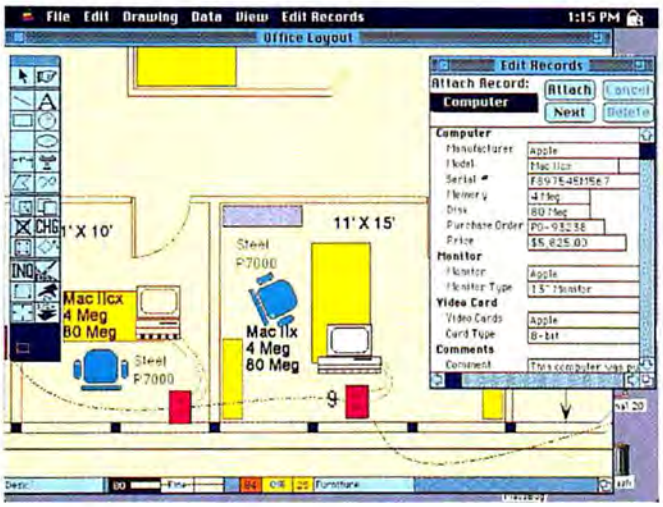
1. You can attach data with variable text to objects in your drawings.
By clicking on the Mac IIx (as shown in picture) data associated with that Mac will be displayed on the screen.

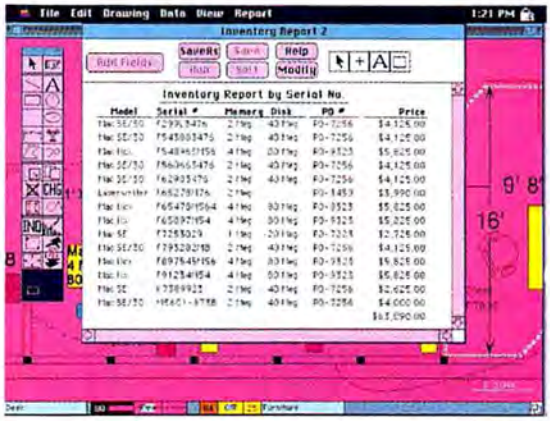
2. You can display data from the database directly on the drawing.
If you update the Mac IIx to a Mac II cx, the information on the Mac will automatically be updated the next time you view the drawing.

3. You can find and highlight objects in your drawings by searching the database.
You'll get a very clear picture of information and projects.

4. You can create reports including only the objects you've highlighted or all of the objects in your drawing.
You can layout reports to your own specifications, and produce counts and totals automatically.

5. You can create vast symbol libraries *with data*.
When you bring a symbol into a drawing, its data will automatically be entered in the database.





"...a new generation of visually oriented database and design packages..."
Macworld • December 1989

6. You can link drawings together to form complete systems.
For instance, if you click on the symbol for a chair in the above drawing, *Aperture* will display the scanned image of the actual chair on your screen.



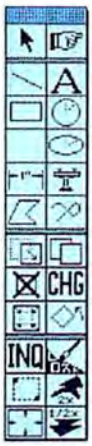
Aperture's drawing facilities are powerful and exciting.

7. You have a zoom range of more than 30,000,000 times.
And you aren't limited to powers of 2. Draw a box around any area of your drawing and *Aperture* will instantly zoom it to fill the screen.

8. You have complete control over positioning your drawing elements.
With *Aperture*, you can start a line, zoom the drawing, move relative to another object, and place the other end of the line precisely where you want it.

9. You can draw with 255 layers and in color.
Name layers and turn them on and off with the click of a mouse. You can even gray layers so they fade into the background—great for tracing.

10. You'll never spend time adjusting lines to meet other lines again.
Aperture automatically snaps to end points, midpoints, center points, intersections, or the edge of objects.



11. You can work in real world dimensions.
You tell *Aperture* the size of your objects using any units you want, from inches to meters to miles.

12. You can print or plot your drawing at any scale with a simple menu choice.
Print test output on 8½ by 11 paper, then scale it to the size you want when you are finished. And you can print any section of the drawing you want at any time. *Aperture* can even make the drawing fit the paper.

13. No more UNGROUPING to change an element.
You won't waste time ungrouping and regrouping just to make a simple change.

14. You'll have drawing style sheets on command.
You'll be able to make changes to whole classes of objects with the click of a mouse. For example, change all your 1 point lines to ½ point.

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15. You can throw away your other drawing programs.
By using *Aperture*, your drawings will finally be able to communicate your ideas. You'll manage complex projects—displaying essential information visually. If you are an architect, space planner, facility manager, engineer, personnel manager, network designer or if you do any work that requires serious drawing, *Aperture* is the software you've been waiting for.

See for yourself. Call or mail the coupon below. We'll send you our in-depth, self-running demo. Enclose $5.00 to cover shipping and handling.

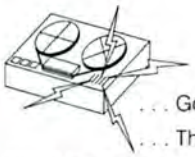
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Mission: Impractical (Jokes)



. . . Good morning, Mr. X. . . . These nine men — noted luminaries in the Macintosh firmament — are the targets of your current assignment, which is designed to momentarily confuse and humble these innocent and unsuspecting captains of industry. . . . As with all good practical jokes (to say nothing of impractical ones), this project will require months of brainstorming, planning, and diligent research. . . . However, timing is of the essence, as this mission can be successfully completed only on April 1, 1990. . . . To speed your preparations, we've asked our resident merry prankster, Guy Kawasaki, to prepare the following ready-made scenarios. . . . Your mission, should you decide to accept it, is to pick your victim, study his dossier, rehearse the voice of the person you are to impersonate, and pick up the phone. . . . As always, should you be caught red-handed, the Editor-in-Chief will disavow any knowledge of your actions and your reputation will self-destruct in ten seconds. . . . Good luck.



By Guy Kawasaki





Victim: Alan Kay
Title: Visionary/Apple Fellow
Telephone: (408) 996-1010
You are: Xerox's legal counsel:
"Alan, I'm calling from Too, Little, & Late, Xerox's legal counsel. We'd like you to get a sodium pentothal shot before we take your deposition about the Apple case."



Victim: Alan Ashton
Title: President, WordPerfect
Telephone: (801) 225-5000
You are: Jack MacAllister, President of US West:
"Alan, this is Jack MacAllister of US West. I've been having a hard time getting through to you. We'd like you to move out of our region so that other people can use the phone."



Victim: Marc Canter
Title: Chairman and founder, MacroMind
Telephone: (415) 442-0200
You are: James Cannavino, President, IBM Entry Systems Division:
"Marc, baby, this is Jim Can o' Wine. You're a multimedia guru: What kind of video camera should I buy?"



Victim: Steve Jobs
Title: President, NeXT
Telephone: (415) 366-0900
You are: CFO of Canon:
"Jobs-*san*, Canon been acquired by Apple. Sculley-*san* would rike to instarr professional management at NeXT."





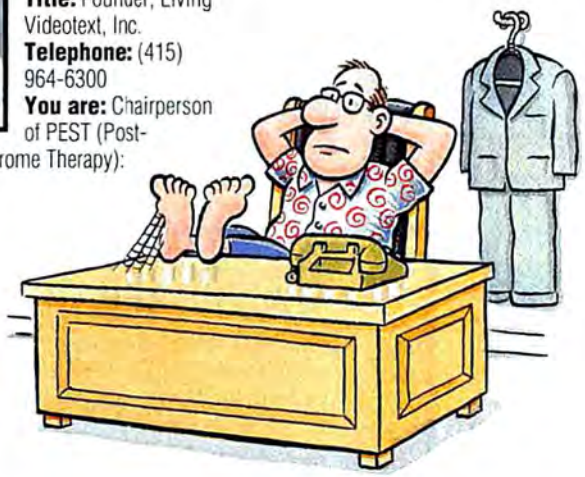
Victim: John Sculley
Title: Chairman, CEO, and President, Apple Computer:
Telephone: (408) 996-1010
You are: Charles Wolf, analyst, First Bank of Boston:
"Hi, John, this is Charlie Wolf. I just thought I'd tell you that I'm changing the status of Apple stock to 'sell.'"

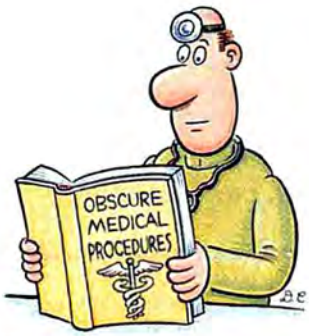


ILLUSTRATION: DAVID COULSON



Victim: Dave Winer
Title: Founder, Living Videotext, Inc.
Telephone: (415) 964-6300
You are: Chairperson of PEST (Post-Entrepreneur Syndrome Therapy): "Dave, I am the chairperson of PEST. Would you be the keynote speaker at the next Silicon Valley chapter meeting?"







Victim: John Warnock
Title: Chairman and CEO, Adobe Systems
Telephone: (415) 961-4400
You are: His doctor: "John, this is your doctor. I just found out about a procedure to remove your Royal pain in the ATM. Let's set up an appointment."



Victim: Bill Gates
Title: Chairman and CEO, Microsoft
Telephone: (206) 882-8080
You are: Senator Alan Cranston: "Son, this is Senator Cranston. I'd like to borrow a few dollars to help an old friend who owns a savings and loan."







Victim: Andrew Tobias
Title: Financial wizard, author, and software developer
Telephone: (203) 226-2400
You are: An officer from his bank: "Mr. Tobias, I'm calling from your bank. Your account is overdrawn."

NewsLine

Reports and Analysis

U.S. MEMORIES NOW A MEMORY

SAN JOSE, CA — After several months of declining industry interest, U.S. Memories, the fledgling DRAM consortium, has formally dissolved. At a meeting in Dallas, U.S. Memories failed to attract any additional manufacturers — even with a scaled-down business plan. The dissolution is expected to secure the market for the Japanese, who already dominate the industry.

DISCOVERY OUT OF BUSINESS

ANNAPOLIS, MD — Discovery Software, which achieved success with Arkanoid, as an arcade game and as Mac software, has closed its doors after a lengthy struggle with Studiotronics over the color-scanning technology in Studiotronics' Colorset product. Discovery had announced a product similar to Colorset called Chroma-32 and had distributed beta versions of the program but never delivered a finished version. Studiotronics has announced that Chroma-32 owners can purchase Colorset for a reduced price.

ABACUS GETS ITS STATS

OAKLAND, CA — As the result of a California state-court decision, Abacus Concepts of Berkeley has regained sole marketing rights from BrainPower to its product StatView 512+. The injunction terminating BrainPower's marketing agreement with Abacus arose from the former company's announced plans to market its own statistics package, called Statalyzer. Abacus, which originally developed StatView 512+, now controls the entire line of StatView programs.

APPLE SHRINKS

CUPERTINO, CA — Responding to a sales slowdown, Apple Computer has announced a plan to reduce its operating costs through layoffs, reduced hiring, a revised salary-review procedure, and a reduction of some employee benefits. In unrelated actions, Allan Z. Loren resigned his position as president of Apple USA, and Michael H. Spindler, previously president of Apple Europe, was named chief operating officer of Apple Computer.

ALDUS EXPANDING?

SEATTLE, WA — Aldus has signed a letter of intent to acquire all assets of Silicon Beach Software, publisher of Digital Darkroom, SuperPaint 2.0, and SuperCard.

Bobker's Dozen

Good Things and Small Packages

By Steven Bobker
Bobker's Dozen, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404
Your suggestions, comments, and products for consideration are welcome.

1 Address Book Plus ★★★★½

Address Book Plus, covered in its beta version here in the February issue, is now out. The final product, with even more useful features than before, is a fast and flawless performer.



The only way Address Book Plus lags behind DynoDex (see February Pinstripe Picks) is its inability to print on both sides of a page. But its wide range of font and type-size options more than makes up for the single-sided printing.

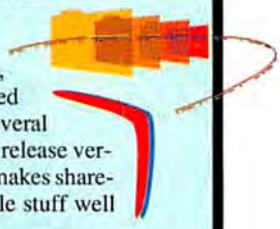
A separate dialer DA lets you access the names and addresses while you're in any application. You can copy them or have the DA dial your phone, but you can not add to or edit your list.

Along with excellent performance, Address Book Plus is a pleasure to use.

Version 2.0. $30. Zeta Soft, 2425B Channing Way, Suite 492, Berkeley, CA 94704; (415) 345-5900.

2 Boomerang ★★★★★

Like Shortcut, which I raved about in the December '89 issue, Boomerang adds extensive navigational and search facilities to all Open and Save dialog boxes. But it works even better. The interface is smoother, and the automatic listings of the most recent files and folders visited makes navigation much easier.



The release version is shareware, and it's been substantially improved since it was distributed for free in several beta versions. I urge you to get the release version — and pay for it. That's what makes shareware work. And this is good, stable stuff well worth its cost.

Version 2.0. $30. Zeta Soft, 2425B Channing Way, Suite 492, Berkeley, CA 94704.

3 PostShow ★★★½

PostShow is an interactive set of modules that lets programmers immediately see the results of their PostScript code. It has a PostScript interpreter built in that knows the 230 commands in the *PostScript Language Reference Manual*, so users don't need an external PostScript device. It's a good environment in which to develop PostScript programs.

Operation is very straightforward, and the menus offer lots of help. The keyword index tells you all the technical details of each supported command. There are some limitations on document and program size, but they are clearly laid out, and you can work around many of them (the manual explains how). Performance can be a bit poky with complicated programs or



output, and hard-copy output from non-PostScript devices is nothing to write home about. Still, if you're interested in the PostScript language, this is an excellent tool. And it can be a real time and money saver for developers.

Version 1.0. $224.95. PostShow Professional (includes all fonts), $294.95. Lincoln & Co., 45 Winthrop St., Concord, MA 01742; (800) 223-7469 or (508) 369-1441.

4 Letter Writer Plus



Recently I saw a beta version of Letter Writer Plus. It looked awfully familiar, and for good reason. Power Up! has acquired ExpressWrite (see Bobker's Dozen, September '89), changed the name to Letter Writer Plus, and eliminated the causes of most of my earlier complaints. This acquisition deal was apparently in place before that review was published.

ExpressWrite's biggest flaw was its inability to use graphics. Letter Writer Plus does let you put graphics into letterheads, but envelopes are still restricted to text.

Letter Writer Plus has an even better interface than its predecessor. Mailmerge was already a strong point of ExpressWrite. Letter Writer Plus, with its ability to use Address Book Plus files, provides a great solution for light- and medium-duty mail-merging.

Printing, which was weak in ExpressWrite, already shows great improvement in Letter Writer Plus. This looks like it's going to be a sure winner.

$89.95 (tentative). Power Up! Software, 2929 Campus Drive, San Mateo, CA 94403; (415) 345-5900.

5 DeskWriter ★★★★½

The HP DeskWriter, Hewlett-Packard's first printer designed specifically for the Macintosh, is an ink-jet unit capable of 300 x 300-dots-per-inch output, just like Apple's LaserWriters. Unlike the LaserWriters, however, it's not networkable. It is speedy and cheap — definitely an unbeatable combination.

But there are trade-offs. Although this QuickDraw printer does do an absolutely superb job on text and a generally adequate job on graphics, there's no PostScript support. You can solve this shortcoming with Freedom of Press (see StartUp Reviews, January '90). Also no spoolers work reliably with it as of yet.

The unit comes with just four basic scalable fonts, and HP charges $95 for each additional font, or $395 for a set of seven.



The best paper to use turns out to be plain bond paper. Ink will be a major consumables cost. The ink currently available smears at the slightest dampness, but HP is working on a nonsmear ink.

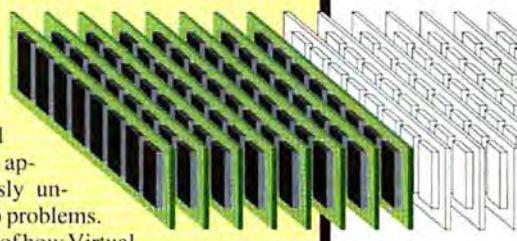
The unit is small and light, though it does require a separate power supply. The driver software provided is excellent and worked reliably with every package I have, except for spoolers.

If you require quality hard copy on a tight budget, the HP DeskWriter is an excellent solution.

$1,195. Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; (800) 752-0900 or (800) 387-3867 (in Canada).

6 Virtual 2.0 ★★★★½

The latest version of this virtual-memory program is far better than even the excellent original (see review, January '90). The most obvious new feature is the extra memory you can access. The 8-megabyte limit is history. With the latest version, I've been able to use up to 15 megabytes on a IIcx. The exact amount of memory you'll have available is related to how many NuBus cards you've installed (subtract 1 megabyte for every installed card). The brief manual is very clear on how to set up for accessing maximum memory.



Performance is superb. The necessary memory swapping is rarely noticeable and never obtrusive. I ran 18 applications simultaneously under MultiFinder with no problems.

You need to be aware of how Virtual operates when working with some graphics applications that generate huge files. The graphics applications look for logically contiguous memory, and the Mac's architecture limits that to about 8 megabytes. Some users have reported problems with sound, but my tests failed to reveal trouble in that area.

Version 2.0. $199; with PMMU chip, $275. Connectix, 125 Constitution Drive, Menlo Park, CA 94025; (415) 324-0727.

7 Precision ★★★

When you first run Precision, things look pretty "normal." It's just another Mac CAD package — or so you may think. Lots of things work just the way you expect them to, but unfortunately, altogether too many others don't. For example, Precision's idea of cut and paste is different from that of any other Mac program. Selecting objects can be inordinately difficult.

Precision can use DXF, IGES, and Summadraft files. It's called a 2.5-D program, so its z-dimension gives 3-D-like effects with far less complexity than most 3-D programs, making them easier to work with. There's a macro language that's really powerful — but its documentation and examples are too scanty.

Performance is slow, often very slow. And the program misbehaved and froze every now and then for no clear reason. Be sure to save frequently when using Precision.

The price is good for this powerful a program; still, the problems and long learning curve required to overcome them are serious. I'm ambivalent about this version of Precision, but the program has great potential.

Version 1.2. $295. Innovative Systems, 171 Interstate Drive, West Springfield, MA 01089; (800) 222-1648 or (413) 737-3993.

8 My Time Manager ★★★½

My Time Manager is a good, basic computerized appointment book without a lot of bells and whistles. Item entry is simple but flexible. You can specify time slots as precisely as exact hour and calendar date or as vaguely as "next Thursday." It's easy to handle overlapping events. There's also an adequate and effective range of reminders.

On-screen you can view time segments in three-month increments, weeks, and days. It's very easy to move to the exact time view or slot you require.

The weakest point of My Time Manager is that only two kinds of reports are available — daily and monthly — and users have no control over what is in the report or how it looks. This is the sort of program that requires an improved ability to customize what is printed out as hard copy.



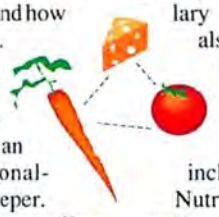
Time-management programs are best run under MultiFinder, and My Time Manager behaves well in that environment, using a relatively small 342K partition.

Version 2.0. $79.95. MacShack Enterprises, 19 Harrington Road, Cambridge, MA 02140; (617) 876-6343.

BOBKER'S DOZEN

9 Nutrition 2.0 ★★★½

An important part of going on a nutritionally sound diet is knowing about the food you've consumed and how it affects your diet. Nutrition 2.0 is a HyperCard stack that makes this job much easier. It's an excellent nutritional-program record keeper.



Nutrition, however, suffers from the drawbacks common to noncomputerized nutrition books: There's a lot of nutritional data here, but there's a lot of data missing. Adding new information is difficult, because the program records so many details about each item. If you enter only the basic nutritional data for a food (which is frequently all you have), you'll throw the ancillary calculations off. It also would be nice if more brand-name foods and common restaurant and fast-food fare had been included.

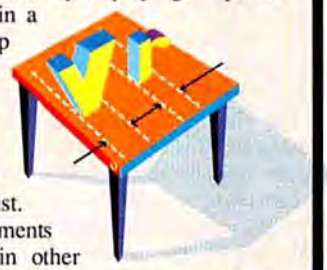
Nutrition has some nice touches, such as a conversion calculator that makes it easier to enter accurate information. The best way to use Nutrition is to record your daily intake on a card or notepad and then enter everything once a day.

Version 2.01. $79. Big Byte Software, 25 Blake St., Needham, MA 02192; (617) 444-3028.

10 KernEdit ★★★★

KernEdit is a basic kerning program. The interface is none too Mac-like, but the program works easily and well for building good kerning tables. The whole process is WYSIWYG and very intuitive.

One of KernEdit's neatest features, WordView, simplifies kerning-table creation by displaying the pair of letters you're kerning in a word. There's a pop-up menu that displays all the words in the current word list that contain the letter pair you're working on. It's easy to add new words to this list.



Actual kerning adjustments are much like those in other kerning programs. Performance is excellent, and movements are fast, smooth, and slick. Maximum resolution is 1/1,000 em.

Your results can be saved as a kerned (modified) font or as a table that can be used with other fonts. This is an excellent tool for improving your fonts' appearance.

Seventeen kerning-table packages are available, each containing 25 tables.

Version 1.06. $149; additional kerning tables, $95 per package. Pairs Software, 160 Vanderhoof Ave., Suite 201, Toronto, Ontario, Canada M4G 4B8; (416) 467-8784.

11 The Vietnam War ★★★★★

Extraordinary is the only adjective that can even begin to describe this HyperCard-based history book. The Vietnam War is a readable and scrupulously fair history of the conflict in Southeast Asia. This enormous effort, by Paul Gabel, provides excellent history through the use of sounds, animation, generally excellent graphics, and unobtrusive but extensive links. The only drawbacks are those inherent in HyperCard: no color, small screens, and slow speed. Even so, The Vietnam War comes across as a tour de force.

You need a hard drive to read this "book." But it's so good that it's worth getting a hard drive just to be able to read it.

Version 2.0. $24.95. Regeneration Software, 377 Collado Drive, Scotts Valley, CA 95066; (408) 438-5791.

12 Halls of Montezuma ★★★★½

If you're a fan of "traditional" board war games, you'll be delighted with the Halls of Montezuma.

All scenarios come in black-and-white and color versions. The black-and-white versions run pretty quickly on 68000 machines, and the color versions are great on Mac II-series machines. There are seven scenarios. They cover U.S. Marine actions in the Mexican, Korean, and Vietnam Wars as well as World Wars I and II. And the games take quite a while to play.

There are two tools for folks who want to create their own scenarios. Warpaint lets you make custom terrain and unit icons in as much detail as you could ever want. Warplan lets you build scenarios. This process of creating new terrains and scenarios isn't fast, but you can obtain professional results.

$44.95. Electronic Arts, 1810 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.

13 MacTography Type Sampler ★★★★

With the proliferation of PostScript fonts, folks specing type for DTP applications have been at a disadvantage. Computers make lousy type books.



What was needed was a comprehensive book with hard-copy samples of all existing typefaces. And that's what the MacTography Type Sampler is. It's a large notebook filled with useful information. The fonts are arranged by publisher, providing adequate samples of thousands of faces. If you spec type, you must have the Type Sampler.

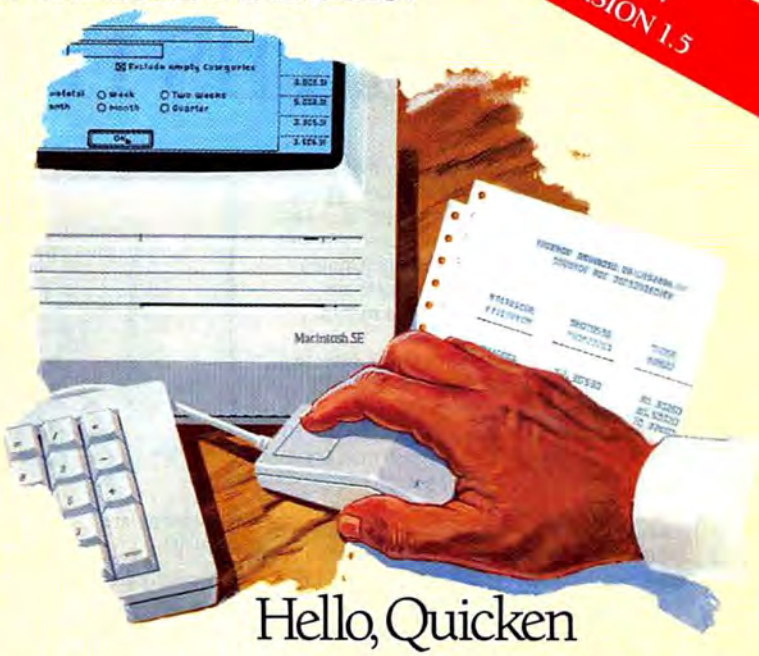
The Type Listing is a Microsoft Works database with typeface names, vendors, unit numbers, prices, and Mac or MS-DOS compatibility. Users can search on any of the fields. This proves to be far less useful than the Type Sampler notebook, but it does serve as a decent index or jumping-off point for the Type Sampler.

$255 (includes update; Type Sampler and Type Listing also available separately). MacTography, 326-D N. Stonestreet Ave., Rockville, MD 20850; (301) 424-3942.

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G-MU04

This month we

Up here in the north country we think all our products are winners. Nevertheless, we are pleased as punch for those of them who were nominees, honorable mentions, and winners in the 5th annual *MacUser* Editors' Choice (Eddy) Awards. You'll find many of them pictured in our product listing this month.

Last month we announced that our order line is now open until 1 AM. Well, this month's news is that our toll-free number (800/334-4444) now works in Canada. So all of you who live even further north than Marlow can call us toll-free. Pretty cool, eh?

The majority of products we carry are covered by 30-60 day Money Back Guarantees (as listed here in red). If you're not happy with one of those products, call us for an authorization and return it *with all of the original packaging* within the guarantee period for a refund check (or credit on your credit card). We reserve the right to limit quantities on such returns.

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5840 SuperANOVA 1.1 *(for Mac Plus/SE)* .. 465.
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4580 FoxBASE+/Mac Runtime 2.0 179.
4844 FoxBASE+/Multi-User 2.0..... 399.
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2611 Insight Expert G/L 2.1..... 395.
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5643 Insight Expert Payroll 1.0..... 395.
2614 Insight Expert Time Billing 2.01 395.
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6372 FrontDesk Multi-User *(1-3 nodes)*.. 134.
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3792 Spellswell 2.2 44.
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Adobe Systems
5750 Adobe Type Manager 56.
6053 Adobe Plus Pack 109.
6156 Adobe ATM/Plus Pack ... *special* 159.
1137 Adobe Illustrator '88 1.9 *(w/ATM)* .. 279.
1138 Collector's Edition I *(Symbols, etc.)* .. 79.
4816 Collector's Edition II *(Patterns, etc.)* . 129.
5606 TrueForm Fill-Out 2.0 169.
5605 TrueForm 2.0 225.



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5425 Art Importer 2.0 89.
6499 Metamorphosis 149.
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Bitstream
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5970 9 Futura Medium 89.
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4838 Quill Pack *(Vol. 8 & 20)* 89.
4836 Headline Pack *(Vol. 10-12)* 125.
4837 Modern Pack *(Vol. 7, 14-18)* 159.
4834 Distinctive Pack *(Vol. 8, 19-22)* 159.
4833 Classic Pack *(Vol. 3-6, & 13)* 159.
1575 Fluent Fonts 2.0 27.

Claris
1123 MacPaint II 2.0 95.
4815 Smart Form Designer 1.01V 295.
1117 MacDraw II 1.1 295.
5911 MacDraw II & MacWrite II Bundle 369.
4814 Claris CAD 1.0 595.

Computer Associates/Cricket
1668 Cricket Graph 1.3 125.
1670 Cricket Presents 2.0 285.

★Custom Applications ... 30 day MBG
6517 Freedom of Press 2.1A 259.

★DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.0 99.

★Deneba Software ... 30 day MBG
6365 UltraPaint 1.5 125.
1769 Canvas 2.1 189.

★DreamMaker ... 30 day MBG
4088 MacGallery *(MacPaint format)* 27.
4840 Cliptures: Business 1 69.
4841 Cliptures: Business 2 69.

Dubl-Click Software
World-Class LaserType Vol. 1-9 *each* 42.
3972 World-Class Fonts! Originals 42.
3973 World-Class Fonts! Stylish 42.
3974 World-Class Fonts! Giants 42.
5131 World-Class Fonts! Triples 42.
3964 WetPaint Classic Clip-Art *(1 & 2)* 42.
3965 WetPaint For Publishing *(3 & 4)* 42.
3966 WetPaint Animal Kingdom *(5 & 6)* 42.
3967 WetPaint Special Occasions *(7 & 8)* 42.
3968 WetPaint Printer's Helper *(9 & 10)* 42.
3969 WetPaint Industrial Revol. *(11 & 12)* 42.
3970 WetPaint Old Earth Almanac *(13 & 14)* 42.
3971 WetPaint Island Life *(15 & 16)* 42.
4940 WetPaint All the People *(17 & 18)* 42.

★Electronic Arts ... 30 day MBG
5289 Studio/1 1.0 $96.
4315 Studio/8 1.0 296.

★Emerald City ... 30 day MBG
6098 TypeAlign for ATM 1.0 60.
5168 Smart Art I 1.0 84.
5602 Smart Art II 1.0 84.
5603 Smart Art III 1.0 84.

★Enabling Technologies ... 30 day MBG
1871 Pro3D 1.2 279.
Clip 3D *(8 clip-art pkgs.)* *each* 57.

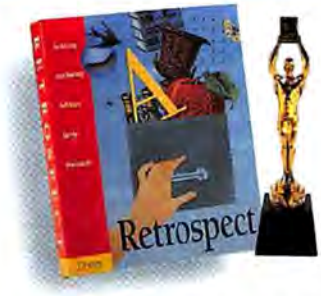
★Farallon Computing ... 30 day MBG
4684 ScreenRecorder 1.0 125.
2199 MacRecorder 2.0 159.

★Foundation Publishing ... 60 day MBG
2385 Comic People 21.
2384 Comic Strip Factory 1.6 38.

★Generic Software ... 60 day MBG
4319 Generic CADD Level 1 1.1 84.

★Good Software ... 30 day MBG
5428 NuPaint 1.0.4 *special* 69.

★Graphsoft ... 30 day MBG
6502 Blueprint 1.0 339.
4993 MiniCad+ 2.0V4 519.



Dantz Development ... 30 day MBG
Retrospect 1.1–1990 MacUser Editors' Choice Award for *Best Backup Software*. "Retrospect can quickly store data on almost every backup medium. It also makes backup chores as painless as possible" $149.

★Great Wave ... 30 day MBG
2272 Crystal Paint 1.0 *special* 25.

Innovative Data Design
2417 MacDraft 1.2B 173.
4707 Dreams 1.0 322.

Letraset
2621 Ready,Set,Go! 4.5 275.
2619 Image Studio 1.5 275.
4709 LetraStudio 1.5 275.
6300 Font Studio 469.
6302 Design Studio 619.
6301 Color Studio 1589.

★Linguist's Software ... 60 day MBG
Over 100 language fonts call
2630 Greek 59.
2636 Kanji 6.0 59.
2625 Chinese Cantonese 79.
2645 Chinese Mandarin 79.
5759 LaserArabic & Farsi 59.
2641 LaserHebrew 79.
2640 LaserGreek 79.
2642 LaserKorean 89.

★MacroMind ... 30 day MBG
4953 VideoWorks II 2.0 189.
4952 VideoWorks II HyperCard Driver 1.2 $64.
4954 VideoWorks II Accel. 1.1 ... *special* 99.
6159 MacroMind Accelerator 125.
5087 MacroMind Director 1.01 445.

★MicroMaps ... 30 day MBG
5516 MacAtlas *(Paint version)* 45.
5514 MacAtlas *(EPSF version)* 105.
5513 MacAtlas *(Professional version)* ... 105.
5515 MacAtlas Presentation Pack 105.

★Microsoft ... 30 day MBG
2878 PowerPoint 2.01 249.

Mindscape
5768 ZING 1.0 125.

Paracomp
4597 Swivel 3D 1.1 299.
5028 ModelShop 1.0 375.

★Preferred Publishers ... 30 day MBG
5751 Exposure 1.1 52.

Quark
4621 QuarkStyle 1.0 call
3230 Quark XPress 2.12 call

★Silicon Beach ... 60 day MBG
3504 Silicon Press 1.1 52.
3506 SuperPaint 2.0 125.
3980 Digital Darkroom 1.1 249.
3507 Super3D 2.0 315.

★Softstream Int'l., Inc. ... 60 day MBG
4996 UltraSpec 1.0 95.

★Solutions Int'l. ... 60 day MBG
3446 The Curator 1.05 72.

★Springboard ... 30 day MBG
3530 Certificate Maker 2.0 22.
3532 Certificate Library 18.
4497 Top Honors 1.01 59.
4500 Springboard Publisher II 109.

★Strategic Mapping ... 30 day MBG
6511 Estatix 219.
6518 MapMaker 4.0 289.

★SuperMac Software ... 60 day MBG
3380 PixelPaint 2.0 225.
5625 PixelPaint Professional 1.0 389.

★Timeworks ... 30 day MBG
5908 Publish-it! 1.1.1 225.

★T/Maker ... 30 day MBG
3632 ClickArt Business Images 32.
3633 ClickArt Christian Images 39.
3635 EPS Illustrations 82.
5167 EPS Business Art 82.



Microsoft ... 30 day MBG
Excel 2.2–*Honorable mention*–1990 MacUser Editors' Choice Award for *Best Spreadsheet*. "Enhanced interface, which adds interapplication communication with *Mail 2.0*"–*Honorable mention (Best Communication Product)* $249.

tried, true, and steady.

3G Graphics
3942 Images with Impact: Graphics 1 . . $51.
4583 Images with Impact: Business 1 . . . 65.
★**Wayzata Tech. ... 60 day MBG**
6370 Quick Art *(CD-ROM)* 175.
★**Wildflower ... 30 day MBG**
6512 SnapJot 2.0 32.
★**Zedcor ... 60 day MBG**
3986 DeskPaint & DeskDraw 2.01 64.

PROGRAMMING & HYPERMEDIA

★**Antic Software ... 30 day MBG**
6100 HOT-SPOT 42.
Apple Computer
1118 HyperCard 1.2.2 42.
Bantam Publishing
1403 Complete HyperCard Handbook . . 22.
★**Beacon Technology ... 30 day MBG**
6426 Gems of The Word 1.0 25.
4967 HyperBible *(King James)* 1.0 145.
4968 HyperBible *(New International)* 1.0 175.
Borland International
1511 Turbo Pascal 1.1 68.
1512 Turbo Pascal Tutor 1.0. 46.
Broderbund Software
5237 Whole Earth Catalog *(CD-ROM)* . . . 89.
★**Digitalk ... 60 day MBG**
5166 SmallTalk/V Mac 1.1 125.



SoftView
MacInTax 1989 1040–1990 MacUser Editors' Choice Award for *Best Personal Finance Package.* "The most popular tax package for the Macintosh. SoftView offers an electronic filing service for fax and disk submissions" . . . $65.

★**DreamMaker ... 30 day MBG**
4115 MacGallery *(HyperCard format)* . . . 27.
★**Emerald City ... 30 day MBG**
5728 LaserTalk 1.0. 149.
Hyperpress Publishing
4233 Icon Factory 1.0 29.
5089 Script Library 1.0 29.
6501 StepAhead 1.0 57.
ICOM Simulations
5681 HyperTMON 1.0. 59.
4085 TMON 2.8.2 87.



SuperMac Software ... 60 day MBG
PixelPaint Pro. 1.0–Honorable mention–1990 MacUser Editors' Choice Award for *Best Graphics Program.* "Limitless colors, sophisticated effects, & an interface for creating, editing, & color-separating full-color images" . . . $389.

Individual Software
4719 101 Scripts & Buttons HyperCard 1.0. 36.
★**Manx Software ... 60 day MBG**
4075 Aztec C + SDB 3.6B. 95.
★**MicroMaps ... 30 day MBG**
5512 HyperAtlas 59.
5518 QuickMap 59.
★**Microsoft ... 30 day MBG**
4471 QuickBasic 1.0 65.
★**Millenium Software ... 30 day MBG**
6105 HyperX 3.0. 65.
★**Now Software ... 30 day MBG**
(formerly SmethersBarnes)
1478 Prototyper 3.0. 185.
Olduvai
5446 PLUS 1.11. 109.
★**Silicon Beach ... 60 day MBG**
5100 SuperCard 1.0 125.
★**Softstream Int'l., Inc. ... 60 day MBG**
6513 Authenticate & Mutate. 79.
5440 HyperHIT 1.0 125.
★**Somak Software ... 30 day MBG**
5897 ScriptEdit 1.1 49.
★**Springboard ... 30 day MBG**
4495 Family Matters 1.0 28.
★**Symantec ... 30 day MBG**
4644 Just Enough Pascal 1.0 52.
3421 THINK Pascal 2.03 103.
3420 THINK C 4.0. 168.
★**Symmetry ... 30 day MBG**
3318 HyperDA 1.2 45.
★**Timeworks ... 30 day MBG**
5905 The Hyperworks Organizer 1.0. . . . 57.
★**TML Systems ... 30 day MBG**
3548 TML Source Code Library II 1.1 . . . 39.
3549 TML Pascal II 3.0 *(w/MPW 3.0)* . . . 109.
Trendware
5203 Stack Cleaner. 29.
5202 HyperTools #1 1.02. 52.
5199 HyperTools #2 1.04. 52.

5609 XCAL 1.0 $77.
True BASIC, Inc.
3587 True BASIC 2.02 55.
3583 Scientific Graphics 39.
3588 3D Graphics. 39.
Additional Toolkits available. call
★**Zedcor ... 60 day MBG**
3985 ZBASIC 5.0. 89.

UTILITIES

★**Abbott Systems ... 30 day MBG**
5236 CanOpener 1.1 64.
★**Affinity Microsystems ... 60 day MBG**
1014 Affinifile 1.1. 45.
1016 Tempo II 1.02 75.
★**Aladdin Systems ... 30 day MBG**
6169 Shortcut 1.0.1. 46.
★**American Power ... 30 day MBG**
6102 PowerChute 65.
★**Berkeley Systems ... 30 day MBG**
5737 After Dark 1.1 22.
1541 Stepping Out II 2.01 49.
Borland
1510 Sidekick 2.0 68.
★**Bravo ... 30 day MBG**
5404 SPAMM 1.1 48.
★**Casady & Greene ... 60 day MBG**
2269 QuickDEX 1.4A 31.
★**CE Software ... 60 day MBG**
4689 MockPackage Plus Utilities 4.4 32.
1727 CalendarMaker 3.0. 32.
6278 DiskTop 4.0. 64.
1729 QuicKeys 1.2 64.
★**Central Point ... 30 day MBG**
5040 Copy II Mac 7.2 23.
5041 PC Tools Deluxe Mac 1.1 45.
★**Connectix ... 30 day MBG**
6123 Virtual 2.0 (for SE/30, IIcx, IIx, & IIci) 115.
6122 Virtual 2.0 (for Mac II, incl. PMMU) . 188.



Farallon Computing ... 30 day MBG
Timbuktu Remote 1.0.1–Honorable mention–1990 MacUser Editors' Choice Award for *Best Connectivity/Networking Hardware.* "Allows you to control another Mac and pass files to and from it through a modem connection". $125.

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MacConnection™

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The experts have spoken



Broderbund Software
SimCity 1.1–1990 MacUser Editors' Choice Award for *Best Recreation Program.* "Interactive simulation that uses real-world data to create the consequences of your actions: pollution, traffic jams, urban blight, & disasters" .. $29.

★Dantz Development ... 30 day MBG
5255 Retrospect 1.1 149.
Dubl-Click Software
1824 Calculator Construction Set 2.01 ... 45.
★Electronic Arts ... 30 day MBG
1843 Disk Tools Plus 1.01 *(Batteries Incl.)*. 31.
★Fifth Generation ... 60 day MBG
4287 PYRO! 3.3 *(screen saver)* 14.
3954 PowerStation 2.5 34.
3955 Suitcase II 1.2.3 44.
5178 FastBack II 2.0 107.
5725 DiskLock 1.0 107.
★HJC Software ... 30 day MBG
4803 Virex *(lastest version)* 52.
5885 Virex *(10 Pack)* 329.
ICOM Simulations
4084 On Cue 1.3 35.
★Insight Development ... 30 day MBG
6173 MacEnvelope 4.1 79.
6171 MacPrint 1.2 95.
★JAM Software ... 30 day MBG
6089 Smart Alarms Single User 49.
6088 Smart Alarms 1-4 Users 99.
6087 Smart Alarms 5-8 Users 149.
6086 Smart Alarms 9-15 Users 199.
6085 Smart Alarms 16-25 Users 299.
★Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 1.0 56.
2591 The NightWatch 1.03 86.
6134 MacSafe II 107.
★Kiwi Software ... 60 day MBG
6267 Kiwi Envelopes! 3.0 35.
★Loop Software ... 30 day MBG
5442 PictureBook 3.2 39.
★Microlytics ... 60 day MBG
2732 GOfer 2.0 45.
★Microseeds Pub. ... 60 day MBG
4848 INITPicker 1.0 25.
4210 Screen Gems 1.0 39.
2913 Redux 1.6 49.
Olduvai
4503 MultiClip 1.01 50.
★ON Technology ... 1 year MBG
6385 On Location 1.0 75.
★Software Innovations ... 30 day MBG
5869 HandOff 1.1 32.
★Solutions Int'l. ... 60 day MBG
3448 SmartScrap & The Clipper 2.1 45.
3449 SuperGlue II 2.0 $61.
★SuperMac Software ... 60 day MBG
3383 SuperSpool 5.0 58.
3382 SuperLaserSpool 2.0 87.
3378 SuperLaserSpool 5-Pack 2.0 289.
3377 DiskFit 1.5 58.
3379 Network DiskFit 1.5 225.
3381 Sentinel 2.0 87.
★Symantec ... 30 day MBG
5176 Symantec Anti-virus for Mac 1.1 ... 68.
5724 Symantec Utilities II for Mac 99.
★Williams & Macias ... 30 day MBG
3779 DiskFinder 25.
3783 myDiskLabeler w/Color 2.9.1I 28.
3784 myDiskLabeler w/LaserWriter 2.9.1LI. 33.
3780 ImageWriter II Label Pack *(Qty. 216)* 15.
3781 LaserWriter Label Pack *(Qty. 216)* .. 18.
4976 Sticky Business 1.0.7 89.
★XTree ... 30 day MBG
5177 XTreeMac 1.02 52.



Acius ... 30 day MBG
4th Dimension 2.0–1990 MacUser Editors' Choice Award for *Best Database.* "Increased power, speed and performance, makes 4th Dimension the most powerful database on the Mac" $469.

LEARN & PLAY

Access Software
4655 World Class Leader Board Golf 26.
Accolade
1184 Hardball *(CP)* 27.
4484 Mean 18 *(CP)* 27.
4485 4th and Inches *(CP)* 27.
Activision
4475 Quarterstaff *(CP)* 29.
4486 Manhole 29.
5127 Manhole *(CD-ROM)* 35.
5517 Cosmic Osmo 41.
★Ars Nova ... 30 day MBG
1215 Practica Musica 2.2 69.
★Bogas Productions ... 60 day MBG
1461 Studio Session 1.2 SE 45.
4255 Super Studio Session 2.0 65.
6135 Super Studio Bundle *(w/5 below)* .. 99.
1459 Heavy Metal Rock 13.
1460 String Quartet 13.
1458 Country Disk 13.
4832 Sound Effects 13.
5719 Brass Disk 13.
Bright Star Technology
3961 Talking Tiles 1.0 27.
1402 Alphabet Blocks 1.0 30.
Broderbund Software
4314 Type! 1.0 $18.
5886 Star Wars *(CP)* 24.
4099 Shufflepuck Cafe *(CP)* 24.
1421 Ancient Art of War *(CP)* 27.
4540 Ancient Art of War at Sea *(CP)* 27.
6516 The Playroom *(CP)* 27.
4229 WhereWorld Carmen Sandiego? *(CP)* 27.
5755 WhereEurope Carmen Sandiego?*(CP)* 29.
5233 WhereUSA Carmen Sandiego? *(CP)* 29.
6384 PlayMaker Football *(CP)* 29.
1423 Jam Session 1.1 *(CP)* 29.
4966 SimCity 1.1 *(CP)* 29.
5871 SimCity Supreme *(CP)* 48.
6515 SimCity Terrain Editor *(CP)* 16.
1422 Geometry 1.2 *(CP)* 58.
4067 Calculus 1.2 *(CP)* 58.
1426 Physics 1.2 *(CP)* 58.
★Bull City Software ... 30 day MBG
5841 Moriarty's Revenge *(CP)* 32.
Bullseye
1545 Fokker Triplane 2.02 *(CP)* 24.
1544 Ferrari Grand Prix *(CP)* 32.
4074 P51 Mustang Flight Simulator *(CP)* . 32.
Carina Software
5726 Voyager 1.2 89.
★Casady & Greene ... 60 day MBG
2268 Crystal Quest 2.2T 25.
4119 Crystal Quest w/Critter Editor 2.2T . 40.
Coda Music Systems
4367 MacDrums 1.01 *(CP)* 31.
4483 Perceive 1.0 49.
5854 MusicProse 1.0 169.
5604 Finale 2.0 569.
Davidson & Associates
1734 Math Blaster! 1.0 *(CP)* 26.
6128 Math Blaster Mystery *(CP)* 26.
4978 Speed Reader II 1.0 *(CP)* 26.
★Electronic Arts ... 30 day MBG
1848 Patton vs Rommel 15.
1850 Reach for the Stars 26.
6297 Halls of Montezuma 26.
5554 Bard's Tale 32.
4064 Chuck Yeager Flight Simulator 32.
4588 Life & Death *(CP)* 32.
4945 The Hunt for Red October 32.
4981 Starfleet 1 36.
1846 Deluxe Music Construction Set 2.5 . 84.



SmithersBarnes ... 30 day MBG
Prototyper 2.1–*Honorable mention*–1990 MacUser Editors' Choice Award for *Best Programming Tool.* "Clearly shows direction CASE interface tools should be taking." 3.0 now supports custom controls & more flexible code generation $185.

and they aren't jokin'.



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SuperANOVA 1.1–1990 MacUser Editors' Choice Award for *Best Data Acquisition/Analysis Product.* Analyzes virtually any general linear model used to perform ANOVA, ANCOVA, MANOVA, MANCOVA, & regression on data $465.

★First Byte ... 30 day MBG

5294 Puzzle Storybook 1.0 *(ages 3-8)* ... 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)*. 27.
3941 SmoothTalker 2.1 32.
3936 KidTalk 2.0 *(ages 5-15)* 32.
3935 Speller Bee 2.0 *(ages 5-12)* 32.

★Great Wave ... 30 day MBG

2277 TimeMasters 1.0 *(ages 4 +)* 22.
2276 KidsTime 1.2 *(ages 3-8)* 26.
5642 KidsMath 1.1 *(ages 3-8)* 26.
4334 NumberMaze 1.1 *(ages 5-12)* 26.
2270 American Discovery 2.3 *(ages 9 +)* 26.
2273 ConcertWare+ 4.0 38.
2271 ConcertWare+ MIDI 5.0 99.

Infocom

5814 Journey 29.
5816 Shogun 35.

Inline Design

5870 Bomber *(includes headphones)* ... 26.

★Learning Company ... 30 day MBG

2670 Reader Rabbit 2.1 *(CP) (ages 4-7)*. . 31.
5453 Talking Math Rabbit 1.0 *(ages 4-7)* . 31.

MicroProse

4697 Pirates! *(CP)* 35.

★Microsoft ... 30 day MBG

2868 Flight Simulator *(CP)* 33.

Miles Computing

5253 The Puzzle Gallery 26.
2765 Fool's Errand 32.
2767 Harrier Strike Mission II *(CP)* 32.

Mindscape

4083 Balance of Power 1990 *(CP)* 29.
3987 Colony *(CP)* 29.
4596 Deja Vu II *(CP)* 29.
2743 Crossword Magic *(CP)* 29.
2749 Shadowgate *(CP)* 29.
5252 Gauntlet *(CP)* 29.
2751 Uninvited *(CP)* 29.

★Paragon Concepts ... 30 day MBG

6094 MacTag 2.04. 42.

★Penton Overseas ... 30 day MBG

5864 VocabuLearn/ce French *(level 1)* ... $29.
5887 VocabuLearn/ce French *(level 2)* 29.
5865 VocabuLearn/ce Italian *(level 1)* 29.
5889 VocabuLearn/ce Italian *(level 2)* 29.
5867 VocabuLearn/ce Spanish *(level 1)* ... 29.
5891 VocabuLearn/ce Spanish *(level 2)* ... 29.
5868 VocabuLearn/ce German *(level 1)* ... 29.
5888 VocabuLearn/ce German *(level 2)* ... 29.
5866 VocabuLearn/ce Japanese *(level 1)* .. 35.
5890 VocabuLearn/ce Japanese *(level 2)* .. 35.

★Personal Training Sys. ... 60 day MBG

Personal Training for Excel

5573 XL1 Beginning Spreadsheets 36.
5574 XL2 Intermediate Spreadsheets ... 36.
5575 XL3 Advanced Spreadsheets 36.
5576 XL4 Creating Business Graphics... 36.
6021 XL5 Building Databases 36.
6020 XL6 Beginning Macros. 36.
6367 XL7 Advanced Macros 36.

Personal Training for Macintosh

5263 B1 The Basics *(for 2 floppy drives)*.. 36.
5264 B2 The Basics *(for Plus or SE w/HD)* 36.
5265 B3 The Basics *(for Mac II w/HD)* ... 36.
5266 B4 Beyond the Basics. 36.

Personal Training for Word

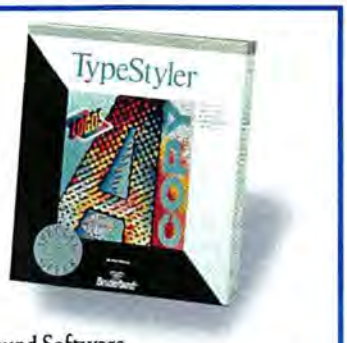
4947 W1 Beginning Level 36.
4854 W2 Intermediate Level 36.
5098 W3 Advanced Level 36.
5418 W4 Additional Features. 36.

Personal Training for Persuasion

5269 LP1 Beginning Persuasion 36.
5270 LP2 Intermediate Persuasion 36.
5271 LP3 Creating AutoTemplates. 36.
5272 LP4 Creating Artwork 36.

Personal Training for HyperCard

5194 H1 Using HyperCard 36.
5195 H2 Creating Cards & Stacks 36.
5267 H3 Basic Scripting 36.
5268 H4 Advanced Scripting. 36.



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TypeStyler 1.0–*Honorable mention*–1990 MacUser Editors' Choice Award for *Best Typographic Product.* "Let's you create sophisticated special effects with thousands of third-party PostScript fonts" $119.

Personal Training for PageMaker

4852 P1 Beginning PageMaker $36.
4853 P2 Intermediate PageMaker 36.
5096 P3 Tips & Techniques 36.
5097 P4 Advanced Features 36.

Personal Training for Works

5196 M1 Database & Form Letters 36.
5197 M2 Advanced Databases 36.
5273 M3 Spreadsheets 36.
5274 M4 Word Processing 36.



Abbott Systems ... 30 day MBG

CanOpener 1.1–1990 MacUser Editors' Choice Award for *Best File-Management Utility.* "Opens any type of Paint, PICT, EPSF, or text file without conversion. Also searches for text strings–even within a graphic" $64.

Personal Training for Illustrator 88

5259 A1 Beginning Illustrator 36.
5260 A2 Intermediate Illustrator 36.
5261 A3 Creating Special Effects. 36.
5262 A4 Precision Drawing Techniques.. 36.

Personal Training for FileMaker

5278 FM1 Beginning FileMaker. 36.
5279 FM2 Intermediate FileMaker 36.
5280 FM3 Advanced FileMaker. 36.
5281 FM4 Tips & Techniques. 36.

Personal Training for FreeHand

6353 FH1 Beginning Level 36.

Postcraft

6466 Citadel 30.

Premier Technology

5773 Strategic Conquest Plus 2.0 34.
5774 NetTrek-The Real Version 34.

Sierra On-Line

3397 Leisure Suit Larry *(CP)* 23.
5694 Manhunter: San Francisco *(CP)* ... 29.
3394 King's Quest *(CP)* 29.
3395 King's Quest II *(CP)*. 29.
3396 King's Quest III *(CP)* 29.
3398 Police Quest *(CP)* 29.
3399 Space Quest *(CP)* 29.
3400 Space Quest II *(CP)* 29.

★Silicon Beach ... 60 day MBG

3502 Beyond Dark Castle 24.
3501 Apache Strike. 24.
3503 Dark Castle. 24.

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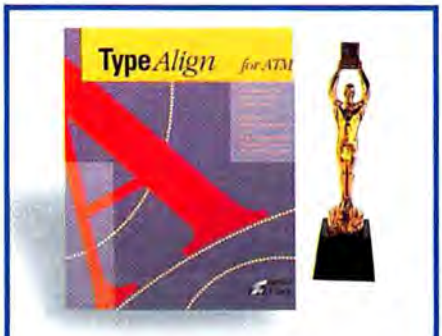
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TypeAlign for ATM 1.0–1990 MacUser Editors' Choice Award for *Best Typographic Product*. "If you have ATM and want to do typographic special effects, TypeAlign is a must" $60.

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4071 Mac•Man 23.
4072 The Solitaire DA 23.
4995 Cribbage Tutor 26.
6259 22nd Street Whist Tutor 32.
6258 MacRummy Tutor 32.
4073 Colour Billiards 38.

★Software Toolworks ... 30 day MBG
1842 Chessmaster 2000 *(CP)* 28.
4619 Mavis Beacon Typing 1.2B *(CP)* ... 32.
6111 Cribbage King-Gin King 39.

★Spectrum Holobyte ... 30 day MBG
4175 Solitaire Royale *(for Mac SE)* 19.
4001 Solitaire Royale *(for Mac II)* 19.
3464 Tetris 19.
4472 Tetris *(color version)* 22.
3462 PT-109 26.
3460 GATO 26.
3459 Falcon 2.0 30.

★Spinnaker ... 30 day MBG
2328 Sargon IV *(CP)* 29.
2329 SAT Score Improvement 1.0 *(CP)* .. 57.

★Springboard ... 30 day MBG
4493 Atlas Explorer *(CP)* 28.
4988 Hidden Agenda 36.

★SubLogic ... 60 day MBG
4698 Jet *(CP)* 32.
Europe, Japan, and Hawaii scenery disks also available *each* 19.

★Think Educational ... 60 day MBG
3615 MacEdge II 1.0 *(CP) (ages 6-12)* ... 27.

True BASIC, Inc.
3571 Algebra *(with workbook)* 45.
3580 Pre-Calculus *(with workbook)* 45.
3575 Calculus *(with workbook)* 45.
6110 Algebraic Proposer 2.0 45.

★Unicorn ... 30 day MBG
3751 Animal Kingdom *(CP) (ages 6-12)* .. 27.
3756 Math Wizard *(CP) (ages 5-10)* 27.
3755 MacRobots *(CP) (ages up to 6)* 27.
3754 Read-A-Rama *(CP) (ages 5-8)* 32.

★Wayzata Tech. ... 60 day MBG
6369 The World Factbook 1989 *(CD-ROM)* 69.

★XOR ... 30 day MBG
6152 TaskMaker *(CP)* 27.
4517 Road Racer *(CP)* 38.
6041 MacGolf *(CP)* 34.
4320 MacGolf Classic *(CP)* 53.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG
4589 InterFAX 12/48 Modem $265.
6266 InterFAX 24/96 Modem 419.

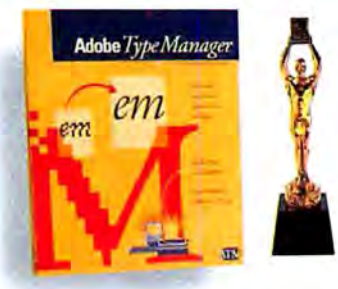
★CE Software ... 60 day MBG
5174 QuickMail 2.0 *(5 user Pak)* 169.
5173 QuickMail 2.0 *(10 user Pak)* 249.

★CompuServe ... 60 day MBG
1676 CompuServe Information Service .. 24.
1673 CompuServe Navigator 2.1 39.
1674 Standard Service/Navigator Bundle 59.

Connect, Inc.
5834 Connect 1.5 for the Macintosh 63.

★DataViz ... 60 day MBG
1823 MacLink Plus/PC 4.1 125.
4842 MacLink Plus/Translators 4.1 99.

★Dove Computer ... 60 day MBG
4939 FastNet III 375.
4938 FastNet SE 375.
5624 FastNet SE/30 375.
4937 FastNet SCSI 749.



Adobe Systems
Adobe Type Manager–1990 MacUser Editors' Choice Award for *Most Significant Software Product* and *Honorable mention* for *Best Typographic Product*. "Provides WYSIWYG display of Adobe PostScript fonts" $56.

★Dow Jones ... 30 day MBG
5295 News/Retrieval Membership Package 24.
1785 Desktop Express 1.03 95.

★Farallon Computing ... 30 day MBG
5707 Timbuktu 3.0 95.
4866 Timbuktu Remote 1.0.1 125.
6371 Timbuktu/Remote Access Pack .. 859.
4867 Timbuktu 30-Pack 3.0 1295.
2201 TrafficWatch 1.08 125.
2202 PhoneNET to LocalTalk Adapter 8.
5664 PhoneNET StarConnector 20.
6273 PhoneNET StarConnector 10-Pack. 139.
4869 PhoneNET Connector 10-Pack ... 198.
2204 PhoneNET PLUS *(DB-9)* 32.
2203 PhoneNET PLUS *(DIN-8)* 32.
5251 PhoneNET CheckNET 64.
4868 PhoneNET Repeater 315.
2206 PhoneNET StarController 825.
2205 Star Wiring Kit *(Punchdown)* 64.
5455 Star Wiring Kit *(Harmonica)* 64.
5893 Portable Pack *(incl. two copies each of Timbuktu & Timbuktu Remote, two StarConnectors, and accessories)*. 375.

★Freesoft ... 60 day MBG
6115 White Knight 11 85.

Hayes
2300 Smartcom II 3.1A $85.
2307 Smartmodem 2400 349.
5991 V9600 Baud Modem 759.

Insignia Solutions
4089 SoftPC 1.3 245.

Intel Corporation
5119 2400EX Modem 179.
6265 2400EX with MicroPhone 1.5 245.

★Microsoft ... 30 day MBG
5858 Microsoft Mail 2.0 Workstation. 84.
5856 Microsoft Mail 2.0 Server. 249.
5857 Microsoft Mail 2.0 *(20 Pack)* 969.

★Nuvotech ... 60 day MBG
3000 TurboNet ST *(DIN-8)* 30.
5277 TurboBridge 319.
6272 NuvoLink SC 319.
6261 TurboStar 1359.

★Practical Peripherals ... 30 day MBG
3102 2400 Baud External Modem 179.
5285 PM 2400SA MNP Modem 209.
3089 Mac Communications Pack 1.5 .. 225.

★Shiva ... 30 day MBG
3444 NetSerial X232 279.
4347 NetBridge 339.
4942 TeleBridge 339.
3443 NetModem V2400 439.
6519 EtherGate 1629.

★Software Ventures ... 30 day MBG
3455 MicroPhone II 3.0 215.

★Solutions Int'l. ... 60 day MBG
4308 BackFAX *(reqs. Apple FAX modem)*. 124.

★Synergy ... 30 day MBG
3130 VersaTerm 4.1.1 88.
3131 VersaTerm-PRO 3.1.1 174.

★TOPS ... 30 day MBG
4598 TOPS FlashBox 119.
3725 TOPS Repeater 119.
3720 TOPS Flashcard 155.
6264 Network Bundle for Mac 3.0 189.
6377 InBox/Mac Administrator *(20 user)*. 215.

★Traveling Software ... 60 day MBG
3729 LapLink Mac III Connectivity Pac.. 114.

INPUT/OUTPUT

★American Power ... 30 day MBG
5895 110SE UPS 209.



Microsoft ... 30 day MBG
Word 4.0–1990 MacUser Editors' Choice Award for *Best Word Processor*. "Added some innovative features, such as an integrated table space maker, completely customizable menus, and dynamic data links" $249.



"I was very skeptical of mail order."

Dear MacConnection,

After some unfortunate experiences purchasing clothes through mail order, I was *very* skeptical of mail order shopping for my Mac. Until a friend insisted that I give MacConnection a try. Your sales-people have been very knowledgeable and helpful in selecting the proper program for the job, your overnight delivery is incredibly fast (even during Christmas rush), and your prices are as competitive as anyone's.

Now I doubt if I'll ever buy my computer-related material any other way!

Joe Van Riper
Charlotte, NC

MacConnection™ 1-800/334-4444

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

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Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!

Call 800/334-4444.

4865	Address Labels 3 1/2" x 15/16" (Qty. 3750)	$15.
4811	Transparencies 8 1/2" x 11" (Qty. 50)	22.
4813	Round Labels 3 1/3" (Qty. 150)	7.
4812	Laser Labels 1/2" x 1 3/4" (Qty. 2000)	7.
4807	Laser Labels 1" x 2 5/8" (Qty. 3000)	24.
4808	Laser Labels 1 1/2" x 4" (Qty. 1400)	24.
4809	Laser Labels 2" x 4" (Qty. 1000)	24.
4810	Laser Labels 8 1/2" x 11" (Qty. 100)	24.

★Basic Needs ... 60 day MBG

5635	Keyboard Flip	6.
5633	LaserWriter Printer Stand	28.
5634	Large Screen Monitor Stand	38.

★Computer Coverup ... 60 day MBG

1722	ImageWriter LQ Cover	8.
1723	ImageWriter II Cover	8.
4657	LaserWriter II Cover	10.
1720	Mac Plus Cover	10.
1724	Mac SE Cover	10.
1725	Mac SE Ext. Keyboard Cover Set	10.

★CoStar ... 30 day MBG

6091	The Organizer	199.

★Goldstein & Blair ... 30 day MBG

2267	The Macintosh Bible (2nd Edition)	19.

★I/O Design ... 30 day MBG

2379	MacLuggage Imageware II	49.
2376	MacLuggage Macinware Plus	64.
2381	MacLuggage Macinware SE	75.
6129	The Ultimate SE Carrying Case	79.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. A partial listing follows.

2577	Mouseway Pad	7.
2563	Mouse Pocket ADB	8.
2569	Mac Plus/SE w/System Saver Cover	9.
2558	ImageWriter II Dust Cover	9.
2589	Universal Printer Stand	15.
4970	Modem/FAX Protector 10	15.
4971	Modem/FAX Protector 20	25.
4126	LaserWriter II Dust Cover	17.
2580	Mac II Stand	20.
2545	Universal Copy Stand	22.
2573	Tilt/Swivel (platinum)	22.
2578	Extra Long ADB Keyboard Cable	25.
2579	Mac II Monitor Cable Extension Kit	33.
4972	Power Tree 10	19.
4973	Power Tree 20	27.
4974	Power Tree 50	54.



Software Ventures ... 30 day MBG

MicroPhone II 3.0–Honorable mention–1990 MacUser Editors' Choice Award for *Best Communications Product*. "Support for ZMODEM protocol. Let's you create a complete custom front end" $215.

2559	Apple Security Kit	$33.
2568	Maccessories SuperBase	33.
2585	Printer Muffler 80	43.
4070	System Saver SE	52.
2566	System Saver Mac (platinum)	63.
2567	System Saver Mac (beige)	63.
2546	A-B Box (DIN-8)	63.
2556	Maccessories Anti-Glare Filter SE	33.
5064	Apple Color Monitor Polarizing Filter	63.
5065	Full Page Display Polarizing Filter	63.
5066	Two Page Display Polarizing Filter	135.
4941	Mac II Monitor Stand	64.
4643	Mac II Stand and Cable Kit	64.
2561	MasterPiece Mac II	105.
5894	PowerBacker 360	269.
5577	PowerBacker 450	339.
5578	PowerBacker 520	399.
5230	PowerBacker 800	749.
5228	PowerBacker 1200	949.

★MacConnection ... 60 day MBG

4623	Solid Oak Disk Case (holds 90 disks)	32.

★Moblus Technologies ... 60 day MBG

4470	Fanny Mac QT	55.



Microlytics ... 60 day MBG

GOfer 2.0–Honorable mention–1990 MacUser Editors' Choice Award for *Best Word Processing Utility*. "GOfer 2.0 can quickly browse through the text in hundreds of pages in hundreds of documents" $45.

★Moustrak ... 60 day MBG

Available in blue or gray.

2694	Moustrak Pad (standard 7" x 9")	8.
2692	Moustrak Pad (large 9" x 11")	9.
2693	Moustrak Pad L/F (9" x 11")	10.

Ribbons

Available in black, blue, brown, yellow, green, orange, purple, red, silver & gold.

3255	ImageWriter II Ribbon	4.
3261	ImageWriter II 4-Color Ribbon	9.
3270	ImageWriter II Rainbow Six Pack	20.
3260	ImageWriter LQ Black Ribbon	17.
4011	ImageWriter LQ 4-Color Ribbon	20.

★Sopris Softworks ... 60 day MBG

4171	Mac SE Std. Keyboard Cover (navy)	15.
4019	Mac SE & Ext. Keyboard Cover (navy)	15.
4017	ImageWriter II Cover (navy)	11.
4018	LaserWriter II Series Cover (navy)	17.
4012	High Trek ImageWriter II Carry Case	49.
4013	High Trek Mac Plus Carry Case	59.
4014	High Trek Mac SE & Ext. Kybd. Case	69.
5877	Mac II Monitor Carry Case	59.
5839	Mac IIcx CPU & Kybd. Carry Case	69.
4861	SE Protection Pak (std. keyboard)	65.
4862	SE Protection Pak (ext. keyboard)	75.



Abaton ... 30 day MBG

InterFAX 24/96 Modem–1990 MacUser Editors' Choice Award for *Best Communications Product*. "Its Fax software is easy to use & produces excellent output: it can also send & receive in the background" $419.

★Targus ... 60 day MBG

3618	ImageWriter II Carry Case	45.
3617	Mac Plus/SE Carry Case	55.
4015	Mac SE & Ext. Kybd. Carry Case	69.
6116	Mac IIcx Carry Case	85.

★Tripp Lite ... 30 day MBG

6199	Isobar 4 (surge suppressor, 4 outlets)	49.
6200	Isobar 6 (surge suppressor, 6 outlets)	59.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped First Class Mail.
- International orders U.S. $250 minimum.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 AM to 1:00 AM EST, or Saturday 9:00 AM to 5:30 PM EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 AM to 5:30 PM EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne Express the same night for delivery the next business day, except for those within UPS Ground Zone 1 (which is also an overnight service). Saturday delivery available to many areas upon request. Some areas require an additional day delivery. The total freight charge on any order placed with MacConnection is only $3.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

soon as you're ready.

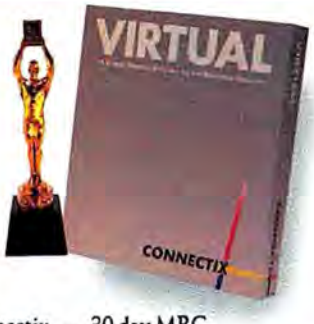


DataViz ... 60 day MBG
MacLink Plus/PC 4.1–1990 MacUser Editors' Choice Award for *Best Connectivity/Networking Hardware*. "The dominant file-translation program between hardware platforms. 150+ translators for Mac, DOS, NeXT, & Sun" $125.

Caere
4476 OmniPage 2.1 539.
★**CoStar ... 30 day MBG**
6067 LabelWriter Labels 11.
6090 LabelWriter 185.
★**Cutting Edge ... 30 day MBG**
3988 CE 105ADB Keyboard w/QuicKeys . 135.
★**Datadesk ... 30 day MBG**
1818 HyperDialer 29.
1819 MAC-101 Keyboard *(beige)* 139.
1820 MAC-101 Keyboard *(platinum)* ... 139.
1821 MAC-101 Keyboard *(ADB)* 139.
★**GDT Softworks ... 30 day MBG**
6256 Printlink Collection 59.
6151 JetLink Express 1.02 89.
6255 Expressive Fonts 119.
6257 JetLink/Expressive Fonts Bundle.. 159.
Hewlett Packard
6514 HP DeskWriter Printer call
★**Kensington ... 30 day MBG**
2576 Turbo Mouse for Mac Plus 3.0 109.
2547 Turbo Mouse ADB 3.0 109.
Koala
2593 MacVision 2.1 219.
★**Kraft Systems ... 60 day MBG**
2600 3-Button QuickStick 39.
4082 3-Button QuickStick ADB 49.
6099 ADB Trackball *(with foot pedal)* 79.
★**Logitech ... 30 day MBG**
5082 ScanMan Mac. 319.
★**LYNX Computer ... 30 day MBG**
1211 LYNX Trackball. *special* 49.
1212 LYNX Trackball ADB *special* 49.
★**Microseeds Pub. ... 60 day MBG**
4843 WristMac 1.0. 145.
5018 WristMac Executive 1.0 189.
★**Mobius Technologies ... 60 day MBG**
6126 Cordless Mouse 99.
★**Mouse Systems ... 30 day MBG**
2808 A+ Mouse 59.
2809 A+ Mouse ADB 79.
★**Nutmeg Systems ... 30 day MBG**
4096 19" Monitor for Mac SE 1195.
5680 19" Monitor for Mac SE/30 1195.
4097 19" Monitor for Mac II 1195.
6240 30/2 Interface *(SE/30 video board)* 499.
Olduvai Software
5138 Read-It! OCR Personal 2.1 125.
3034 Read-It! OCR 2.1 $245.
★**Orange Micro ... 30 day MBG**
4488 Grappler Spooler 47.
3036 Grappler C/Mac/GS 2.0 78.
4487 Grappler LS 1.0 103.
6229 Grappler LX 129.
Summagraphics
4298 BitPad Plus ADB 319.
TheComplete PC
6104 TheComplete Half-Page Scanner/400 315.
6103 TheComplete Page Scanner 759.
★**Thunderware ... 30 day MBG**
3648 ThunderScan 5.0 with PowerPort . 185.
4994 LightningScan 369.
3645 Mac II Power Accessory 45.

MEMORY & DRIVES

1 Meg SIMMs
1107 *Low profile 80 nanoseconds SIMMs at the best prices. 2 year warranty* 89.
★**Cutting Edge ... 30 day MBG**
3989 800k External Disk Drive *(platinum)* 149.
5133 20 Meg Hard Drive 359.
3990 30+ Meg Hard Drive 429.
3991 45+ Meg Hard Drive 489.
5275 65+ Meg Hard Drive 589.
5276 80+ Meg Hard Drive 649.
5456 44 Meg Removable Drive 799.
5736 44 Meg Removable Cartridge 109.
★**Dove Computer ... 60 day MBG**
1802 Dove Tool Kit 15.
1801 SCSI Interface/Port 109.
5879 MaraThon Serial/Parallel 195.
1807 MacSnap 524E 185.
1809 MacSnap 524S 239.
1811 MacSnap 548E 419.
1812 MacSnap 548S 479.
1804 MacSnap 2S 189.
1805 MacSnap 4S 369.
ACCELERATOR BOARDS
1793 MaraThon 020 MSE1 419.
1794 MaraThon 020 MSE2 *(1 Meg)* 689.
1795 MaraThon 020 MSE3 *(math chip)* .. 579.
1796 MaraThon 020 MSE4 *(1 Meg/chip)* . 869.
5192 MaraThon 020 MSE5 *(4 Meg)* 799.
5193 MaraThon 020 MSE6 *(4 Meg/chip)* . 979.



Connectix ... 30 day MBG
Virtual 2.0–1990 MacUser Editors' Choice Award for *Best General Utility*. Virtual can give your Mac 14 Meg of memory today with the addition of simple virtual memory software see line listing.

4663 MaraThon 030 Accelerator 32 MHz $869.
5878 MaraThon 030x Accelerator 969.
5880 MaraThon 030 SE/30 Accelerator .. 969.
5623 MaraThon Racer. 159.
ACCELERATORS (020) W/ETHERNET
5391 FastNet LAN 1 949.
5390 FastNet LAN 2 *(1 Meg)* 1349.
5389 FastNet LAN 3 *(math chip)*..... 1219.
5388 FastNet LAN 4 *(1 Meg/chip)* 1549.
5387 FastNet LAN 5 *(4 Meg)* 1439.
5386 FastNet LAN 6 *(4 Meg/chip)* 1679.



Informix
WingZ 1.1–1990 MacUser Editors' Choice Award for *Best Spreadsheet*. "WingZ is not just a powerful spreadsheet, it's a sophisticated development environment for customized applications." 3-D graphics and tools .. $249.

★**Kennect Tech. ... 30 day MBG**
5631 Rapport 199.
5632 Drive 2.4 *(includes FastBack II)* ... 329.
★**SuperMac Tech. ... 30 day MBG**
SuperMac drives include SuperSpool, SuperLaserSpool, Diskfit and Manager
5452 Dataframe 20 529.
5447 Dataframe XP 30 629.
5448 Dataframe XP 60 859.
5449 Dataframe XP 100 1149.

STORAGE MEDIA

★**Verbatim ... 60 day MBG**
3772 3½" DS/DD Disks *(10)* 15.
3773 3½" HD Disks 1.44 Meg *(10)* 29.
★**Sony ... 60 day MBG**
3297 3½" DS/DD Disks *(10)* 13.
6148 3½" DS/DD Disks 3 Pak *(30)* 30.
3298 3½" HD Disks 1.44 Meg *(10)* 24.
6375 3½" HD Disks 3 Pak *(30)* 60.
★**MAXELL ... 60 day MBG**
2792 3½" DS/DD Disks *(10)* 14.
2793 3½" HD Disks 1.44 Meg *(10)* 27.
★**3M ... 60 day MBG**
3943 DC2000 Tape Cartridge 20.

ACCESSORIES

Apple Computer
1113 Black ImageWriter Ribbon 10.
1114 LaserWriter Plus Toner Cartridge.. 109.
1115 LaserWriter II Toner Cartridge 115.
★**Avery ... 60 day MBG**
4864 Disk Labels 3½" *(Qty. 250)* 13.
5392 Disk Labels—Laser 3½" *(Qty. 630)*. 29.
5403 Address Labels 17/16" x 4" *(Qty. 1000)*... 9.

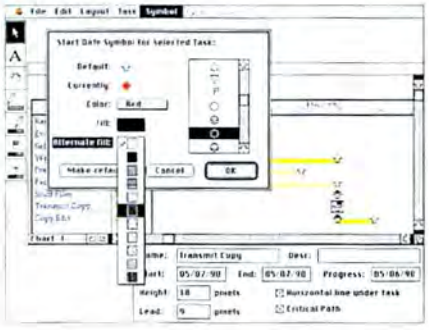
Pinstripe Picks

By Robert R. Wiggins

Great Gantt!

★★★½ As its name implies, Great Gantt! does one thing very well: creating Gantt charts. Recognizing that many project planners have found the pseudo-Gantt charts in MacProject lacking, the developers of Great Gantt! created a program that not only creates Gantt charts from scratch but also reads data directly from MacProject and MacProject II files.

Great Gantt! gives you full control over the symbols used as markers; colors; fill patterns; and type font, size, and style and provides many options for tailoring the chart layout to your needs. Creating a new chart, or modifying an existing one, is easy with Great Gantt!'s tool palette: A click and drag lays out a task.



The major drawback of Great Gantt! is actually a drawback of Gantt charts in general: Task dependencies are not recorded. The interface tool can denote a dependency, but this is a notational convention only.

If you're a Gantt-chart person trapped into using MacProject, then Great Gantt! is for you. But if you've already moved on to MicroPlanner from MacProject, you've probably left Great Gantt! behind as well.

Version 1.0. $195. Varcon Systems, 10509 San Diego Mission Road, Suite K, San Diego, CA 92108; (619) 563-6700.

PINSTRIPE PROFILE

Making Taxes Less Taxing

What started as a nifty idea, using the Mac's WYSIWYG capabilities to duplicate federal tax returns, has grown into a mini-industry. In addition to the "personal edition" of MacInTax that includes easy-to-fill-out federal and state tax forms, SoftView now offers a line of professional tax-preparation packages for tax preparers that includes partnership, corporate, and Subchapter S corporate returns.



For 1990, SoftView has joined forces with InstaTax to offer you electronic filing capability — if you are due a refund. You just print out and sign form 8453, attach any required documents (such as W-2 forms) and mail them to InstaTax with either a disk or a printed copy of your return, and InstaTax handles the rest for a fee of $29.95 per return. If you're in a rush, you can even fax copies of all the documents to InstaTax and then drop form 8453 into the mail. If you authorize the IRS to do a direct deposit, your refund will be in your bank account in about 18 days, and a mailed check takes only 5 days more.

Because the tax laws change every year, SoftView offers upgrades, complete with a new manual (called an annual renewal), for about 45 percent off the retail price. That sounds terrific until you realize that ordering a new version of MacInTax from a mail-order house costs only a few dollars more. SoftView offers excellent support, but its upgrade policy could stand improvement.

SoftView, 1721 Pacific Ave., Suite 100, Oxnard, CA 93033; (805) 385-5000.

Managing Your Money

★★★★½ Because the tax laws change every year, there's a new version of Managing Your Money (MYM) every year, and this excellent personal-finance program devotes a full menu (and more) to handling your taxes and your tax planning.

The primary purpose of MYM is to keep track of what you get to keep, not what you have to pay the government — and it does a fine job. It's a bit more complex than Quicken or MacMoney (the competition), but it also does more.

The 1990 version does more than change the tax sections of the program. There are several important fixes and new features. Some are immediately visible; some are harder to see but are no less important.

New sorting routines, for example, speed up sorts and report printing noticeably. More obviously, the loan calculation section now handles variable-interest loans, which lets you account for up to four changes of the rate of interest during the term of a loan.

Check printing has been improved again, and MYM now supports the HP DeskWriter as well as ImageWriters and LaserWriters. A new check design provides less wasteful results. Reports now command their own menu. And the Enter key finally works as it should — it enters transactions.

The bottom line is that a very good program is even better for 1990. And that's good news for anyone who needs help managing their money.

Version 3.0. $219.88. MECA Ventures, 327 Riverside Ave., Westport, CT 06881; (203) 226-2400.

BUSINESS BOOKSHELF

The Macintosh Small Business Companion

★★★½ What do you do if you use a Macintosh in a small business and you want to know more about something? In a big business, you ask a coworker, but in a smaller operation, you're on your own. You can join a user group, if you have the time and if one's convenient to you. Cynthia Harriman's book tells you where to turn (once you've become as much of an expert as you can on your own).

The Macintosh Small Business Companion covers such subjects as business correspondence (including envelopes, mailing labels, and form letters), accounting, connectivity (including electronic mail and fax), printer alternatives, hard drives, and even how the System and Finder work. Two chapters cover keyboard shortcuts and macros to make you more productive, and there are even some profiles of other small-business Mac users so you can see what your peers are doing. There's nothing earth-shattering here, but if you're a typical small-business Mac user, the book hits its mark.

$24.95. Brady, Simon & Schuster, 15 Columbus Circle, New York, NY 10023; (212) 373-8000.

Flexigraphs

★★★★½ Lying with statistics has a long and storied history in the business world, and now there's a whole new way to be creative with numbers — Flexigraphs. Normal business graphics start with numbers and create charts; Flexigraphs lets you start with the chart and make it look the way you want, and then it generates the numbers necessary to produce the chart. Misleading? Perhaps, but Flexigraphs doesn't lie to people — people lie to people.

There are actually legitimate uses for "flexigraphy," as the developers of Flexigraphs like to call the process. When forecasting, you often have to make up numbers anyway, so why not use Flexigraphs to make them look good in chart form? You can start from a pie chart, a bar chart, a line chart, or even a spreadsheet, and use special tools such as the wand, upcurve, s-curve, interval, and ghost to manipulate your charts to create data. You can control colors, patterns, lines, and fonts and can also create constraints and lock parts of graphs when you're happy with a particular section.

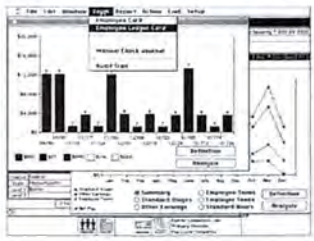


Flexigraphs is easy to use, and its 92-page manual is more than sufficient to get you started. The interface is simple yet elegant. You'll never look at a forecast the same way again.

Version 1.0. $179. Tree Star, 1802 Hillside Road, Santa Barbara, CA 93101; (805) 682-4096.

Insight Payroll

★★★★½ Insight Payroll is the newest module in the popular integrated accounting solution. While it can be used as a stand-alone program for preparing your payroll, it is best suited as part of the total accounting solution provided by Insight General Ledger.



Like its siblings, Payroll features an icon bar for quick access to various payroll records. Everything associated with doing payroll is included, from FICA and tax withholding (federal, state, and local) to generating W-2, 940, and 941 forms. The 500-page manual is comprehensive as well.

The biggest problem with maintaining a payroll system is keeping up with changes in the tax laws and withholding rates. Layered offers an annual subscription to an update service so you can keep current, and the program lets you create special taxing authorities if you have special local-tax requirements. With the addition of Payroll, the Insight system offers a comprehensive and complete accounting solution.

Version 1.0. $695 (includes one free tax update). Layered, The Schrafft Center, 529 Main St., Boston, MA 02129; (800) 622-4436 or (617) 242-7700.

QuickPie

★★★★ One way to achieve success is to do just one thing and to do it very well. By that standard, QuickPie is a success indeed. Because all it does is pie charts and it's only a DA, it suffers when compared with other charting and graphing solutions. If pie charts are your thing, however, QuickPie delivers more than you can get with a spreadsheet.

QuickPie can create pie charts from pasted spreadsheet data, or you can enter data in degrees, percentages, or any unit of measurement, and the program automatically scales the data into pie wedges. Once a pie is created, you have full control over its appearance, with several options for labeling, multiple patterns and colors, 3-D effects, and exploding pie wedges. Label, legend, and title text can be in any font, size, or style; and when you copy the chart to the Clipboard, you have the option of resizing the chart and copying the pie and legend separately or together. QuickPie's best feature is its ability to use any graphic as the face of the pie, and it has a Scrapbook file with samples.

QuickPie has two shortcomings: The documentation is so superficial that you need a fair amount of knowledge to install and use the program, because the manual has no installation instructions. The other drawback actually grows out of all the features: The charts that QuickPie produces can be so complex that you sometimes can't paste them into some applications. But if you're into pie charts, these flaws won't stop you from getting your money's worth out of QuickPie.

Version 2.0. $55. Prophecy Software, 3650 Silverside Road, Suite 3, Wilmington, DE 19810; (302) 994-1502.



Hand Tools.

You know what it's like.
If you're in graphic arts, you know there's a lot of grunt-work.

Like rubbing-down type. And tracing and filling letters to comp-up headlines.

Trying to get true colors from a junkyard of dried-out markers.

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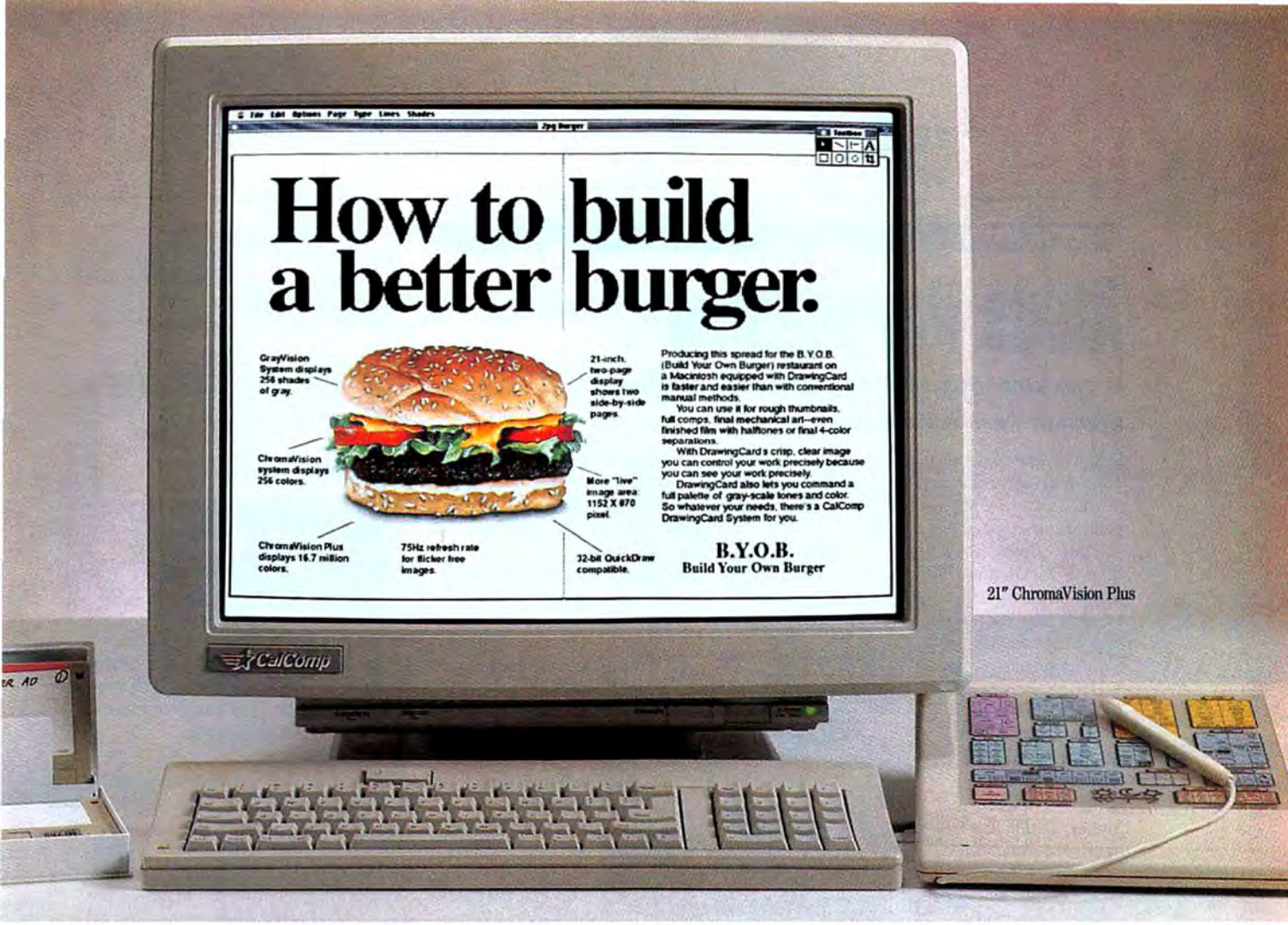
CalComp large screen displays help you get the most from your Macintosh. For one thing, they never let you lose sight of the big picture. DrawingCard is the first 21″ system to give you two full pages of color side-by-side at actual size. That's critical when you're designing double-truck ads, brochure spreads or creating a large horizontal illustration.

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And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.

All screen images were scanned, imported, displayed and photographed on CalComp DrawingCard displays.

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Power Tools.

There are three DrawingCard systems to choose from. Our 8-bit GrayVision display system with 256 shades of gray is ideal for desktop publishing and design projects using line art and black-and-white halftones.

Our 8-bit ChromaVision system with 256 colors is the perfect match for the great majority of desktop publishing, design and illustration projects where 4-color reproduction is needed.

And our 24-bit ChromaVision Plus system (shown above) with 16.7 million colors is the ultimate display where color accuracy is especially critical such as color retouching.

DrawingCard display systems are just one way CalComp, a worldwide graphics leader, supports the arts on Macintosh. There's also WIZ,™ a new mouse system that combines the features of a traditional mouse with the power of a graphics pad. Plus a complete line of high-performance printers.

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PRESENTATIONS

Aldus Persuasion

If you want the best presentation package around, Persuasion is it.

When Persuasion was first released, *MacUser* called it the Rolls-Royce of desktop-presentation software. So many enhancements have been added to version 2.0 that it's become something akin to the Bentley Turbo R: a Rolls-Royce in most respects but with an incredibly powerful engine under the hood that puts it in a class with sports cars.

Before Persuasion 2.0, choosing a presentation package depended on what you were going to do with it: MORE II did the best on-screen presentations, PowerPoint was easiest to use, and Cricket Presents! supported background masters. Now, choosing is no longer necessary. Persuasion 2.0 is simply the best in its class and easier to use than its competitors, whether you're creating slides or doing on-screen presentations (although MORE II still has a slight edge here). And it's even pretty good in some other classes, such as drawing, charting, and outlining.



Persuasion 2.0 is the best presentation package you can buy. Among version 2.0's improvements are a context-sensitive on-line help facility, with cross-referencing.

WHAT'S NEW Persuasion's strong suits have always been its use of templates (called "autotemplates" even though only the default template is actually automatic) and multiple master slides, and these areas have both been improved further. You can now import autotemplates into existing presentations with two options: Replace causes masters with the same names to be replaced and the slides using the masters to be re-created; Append adds the masters from the imported autotemplate, changing the names of any with duplicate names to make them unique. Using this new feature, you can completely alter everything about a presentation (except the actual presentation text and graphics) almost instantaneously. Aldus has also added a new kind of master, the background master, to let you further customize your slides and presentations. You can choose whether to let masters use their own fills or the background master's fills. You can even create masters based on slides. Persuasion 2.0 also supports placeholders on masters for slide numbers, subtitles, and note text.

Persuasion's outlining capabilities were good in its initial version, but they're excellent in version 2.0. You can now define styles for up to 15 levels of outline text and select multiple outline headings for dragging, cutting, copying, pasting, expanding, collapsing, or even setting slide options such as assigning masters or setting transition effects. You can have note headings interspersed throughout your outline rather than stored separately on note pages. And using note placeholders, you can have these headings dynamically linked to note pages for printing out.

Persuasion 2.0 supports outline subtitles for those times when a two-level title is necessary, and the subtitles are dynamically linked to subtitle placeholders in slide masters.

Persuasion's weakest point was its slide-show capability, but it has been substantially improved. More than a dozen transition effects (wipes, dissolves, and so on) can be set globally or on a slide-by-slide basis. You can set documents to automatically open in slide-show mode. Persuasion 2.0 gives you full control of a slide-show presentation from the keyboard, often with multiple keystroke options for each action, and it supports the Kodak DataShow.

Persuasion 2.0 adds numerous other enhancements, such as context-sensitive on-line help, combination charts, superscripts and subscripts, zooming up to 400 percent, the ability to adjust graphics after changing formats, and additional conversion capabilities for importing slides from other programs — particularly PowerPoint. So if you have already prepared PowerPoint presentations, you can easily bring them into Persuasion. All the changes are documented in a 125-page *New Features Guide* as well as in the new on-line help facility.



Persuasion 2.0 lets you select "fine background fill" to get the same smooth background fills in slide view that you get in the slide show. You can also zoom in on slides up to 400 percent.

THE BOTTOM LINE If you've been delaying your purchase of a presentation program or thinking about changing brands, now is the time to move to Persuasion 2.0. It offers the widest range of capabilities of any presentation program, coupled with ease of use, and it even makes it easy for you to convert your presentations from other programs.

— Robert R. Wiggins

Get Info

Aldus Persuasion
★★★★★
List Price: $495.
Published by: Aldus Corp., 411 First Ave. S., Seattle, WA 98104; (206) 622-5500.
Version: 2.0.
Requires: System 4.1 or later and hard-disk drive.
Application Size: 924K.
Compatibility: Mac Plus or later.

CAD

ModelShop

Paracomp's powerful 3-D modeling package could stand some navigational and editing improvements.

With ModelShop, Paracomp (maker of the top-rated Swivel 3D modeling program) has succeeded in creating a low-end version for sketching architectural designs — and has also failed. ModelShop achieves its goal with a $595 price and its ability to create true 3-D color models with good rendering speed. Unfortunately, it's almost as if Paracomp had created a low-end product by disabling, rather than omitting, features.

Take the tools for measuring and labeling distances and angles. The measured dimensions appear on-screen, but there is no way to get dimensions on a printout. They also disappear from your screen when you redraw. Since Paracomp went to the trouble to give you these tools, why didn't it allow the dimensions to be printed out? A small point, but this kind of thing is evident throughout the program.

PUNCHING HOLES This lack of detail is frustrating, because ModelShop has some useful features going for it. The best is the Hole tool, which is handy for creating windows in solid walls, a feature many higher-end CAD packages lack. There are some limitations, but without hole cutting, you have to create four separate walls and align them to define a window space. I wish I could buy this one tool separately for all the CAD packages that don't have it.

You'll also like the fact that you can select and edit objects in the rendered mode, which is called the Hidden Surfaces mode in ModelShop. Being able to do last-minute editing of solid objects can save you a great deal of time, compared with having to go to the wire-frame mode to make changes, as many other programs require.

The Extrude tool is another great time saver. After you select a 2-D object or group of objects, such as a floor plan, Extrude lets you create the third dimension by clicking and dragging the mouse.

ModelShop uses the click-and-drag approach for most operations, which can take some getting used to if you've been using other graphics programs — even those for the Mac. Instead of having buttons for changing a perspective view or light source, you have to perform a series of mouse clicks. Once you've learned ModelShop, some of these operations may become second nature, but you definitely need to read the manual.

Some aspects of the interface are unnecessarily un-Mac-like. For instance, ModelShop beeps at you when you do the *right* thing with your mouse clicks, instead of when you click on the wrong place, as is the case with the vast majority of Mac programs. Another deviation from the norm is the way you move objects. Instead of selecting an object and dragging it, as you do in MacDraw and other programs, you select the object, select the Move tool, and then draw the distance and direction you want it moved.



ModelShop is a fast and powerful architectural sketching tool, but it could stand some improvement. Setting up a perspective view such as this is a lot more complicated than it should be.

MORE STEPS The problem with the procedures in ModelShop is not just that they differ from what you're accustomed to, but also that they require more steps. Creating and changing a drawing's view requires several steps every time. More-expensive programs such as DynaPerspective and StrataVision default to displaying four windows of different views (top, elevations, perspective, and axonometric), and let you change from there. Multiple views are practically requisite when working in 3-D, especially with complicated drawings. In ModelShop, you have to create every view except the Plan (top) view manually.

And creating views isn't always straightforward. Whenever you switch to a perspective view in ModelShop, you get the Plan view. You then have to go through the view-selection procedure, which involves four mouse clicks. A Perspective View command should give you a real perspective view and let you change it from there. If you want to change the perspective view in ModelShop, the program automatically zooms to the farthest point out, requiring you to zoom in again. All this is unnecessary and a great hindrance. (Fortunately, you can stop a redraw with a mouse click, so you don't have to wait for multiple redraws.)

I also wish you didn't have to reselect and redraw the grid every time you changed the view. The disappearing grid might make a nice option, but you should be able to keep the grid if you want it.

Another annoyance is the Tweaking tool, for editing the size and shape of objects. It's a good feature, but you can alter only one corner at a time. If you want to stretch a rectangle, you have to tweak it twice, once for each of two corners.

Currently, ModelShop imports only PICT files, although a future release will import Swivel files as well. ModelShop can work with a megabyte of RAM, but I had to bump up the memory allotment under MultiFinder from the suggested 582K to 1 megabyte to open larger files.

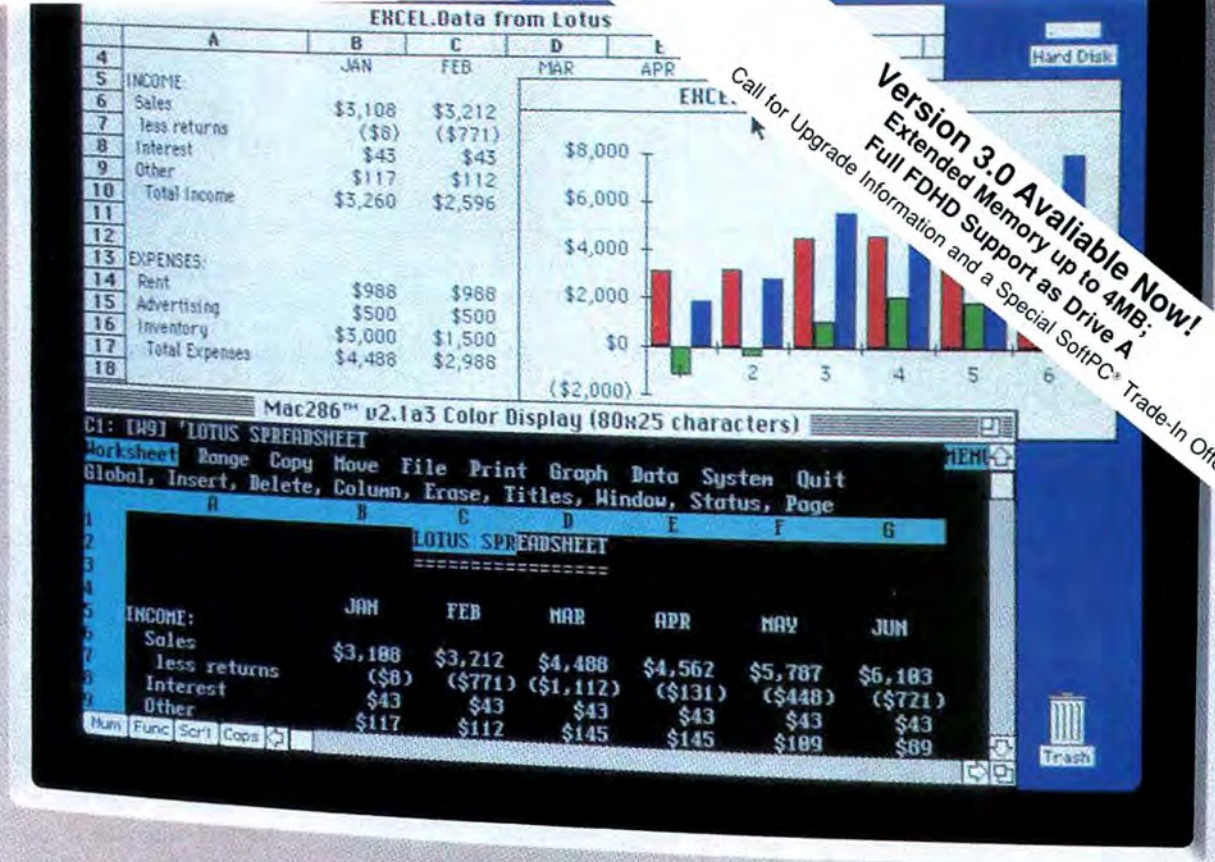
THE BOTTOM LINE ModelShop is a quick program with a few time-saving features, but its lack of many other features will slow you down. While this handicaps ModelShop right now, the programming problems don't seem difficult to overcome, so a better version may be coming in the future.

— John Rizzo

Get Info

ModelShop 1.0 ★★★½

List Price: $595.
Published by: Paracomp, Inc., 123 Townsend St., San Francisco, CA 94107; (415) 543-3848.
Requires: Hard-disk drive.
Compatibility: Mac Plus or later.



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ORGANIZATIONAL TOOLS

KeyPlan

Managers uncomfortable with complex project-management programs should love this hybrid outliner/planner.

When we looked at a beta version of KeyPlan last October, we called it an intuitive project-management program with a strong outliner. KeyPlan is now shipping, and it lives up to expectations. This is a good combination outliner and project planner that's ideal for managers or planners who don't need or want the complexity of more-powerful programs such as MacProject II.

WHAT IT IS According to KeyPlan's documentation, the outliner "acts like most other outlining programs," and that's about all that need be said about the outliner. It looks, feels, acts, and works like any standard outlining program.

The project planner is a little different, though. Driven by the outliner's three levels — task, milestone, and subplan — KeyPlan can create network diagrams, Gantt charts, and project lists. KeyPlan's network diagrams show order of precedence, but no summary statistics such as start date or slack times are displayed on the chart. These statistics are reserved for a window at the bottom of the screen called the Task Info window. The window can be "rotated," to show the layers of detail supporting the summary statistics, or kept at a nominal size to show only summary information.

KeyPlan calculates a project's critical path. The critical path is graphically identified by a double-thickness line (or by a red one on color systems).

Editing a network diagram makes good use of the Mac interface. With that interface, tasks are easily created, dependencies established, and schedules accommodated. KeyPlan is smart enough to catch dependency conflicts as you change tasks, and it warns you when such conflicts occur. Conflicts can then be adjusted or overridden.

To size a network diagram, KeyPlan uses a unique graphic system that depicts the size and orientation of charts. In essence, you view the charts from above, superimposed on a size grid. This approach ensures that you won't print charts that are too big, and it lets you reorient your work so you can see it in full-screen views.

You enter and manipulate overhead costs by using a distinct view, or window, that resembles the List, or tabular-data, view. The Overheads and Resource views are used to enter the details of any ongoing costs that are not specific to a single project. The Resource view can also be used for recording details of costs and income anticipated as a result of a project. Lists can be sorted and printed for selective reporting.

Sitting in the background, like a watchful eye, is the base calendar. The base calendar is the time system from which all the project timings are generated. A nicely designed dialog box lets you customize for days and time. KeyPlan can plan time in increments of minutes, hours, days, and weeks.

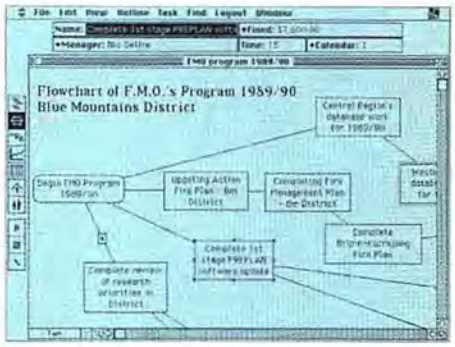
Calculations can run every time a change is made or can be driven manually. During calculation, report-date conflicts can automatically be brought to the surface, the calculation suspended, and the pertinent information displayed to help you resolve the conflict.

To run a master plan, KeyPlan uses a subplan scheme in which individual projects, or subplans, are all rolled together into a single large plan. The linking and reporting using subplans works quite well. You can use the Select command to query KeyPlan interactively, displaying only those elements of a plan that you want to review, such as tasks with no float time.

Plan (network), Bar (Gantt), and Graph views can be annotated with text, frames, or lines to highlight information or make a point. Graphics can also be imported via the Clipboard. As you would expect from a Symmetry product, KeyPlan can import and export Acta files. KeyPlan also offers standard file export to spreadsheets and databases.

KeyPlan's printing subsystem is also pretty smart. Recognizing that components of large plans have to be joined together when printed, the designers incorporated a system that leaves an adequate margin around each page so that multiple pages can be taped together easily. The printing system also allows you to position the network-diagram graphics anywhere you want on multiple sheets of paper. KeyPlan supports color and PostScript fonts.

KeyPlan is a snazzy system. The on-screen presentations are crisp, the on-line help is helpful, and the documentation is good. The program is a great tool for project managers who want to use a project planner as an adjunct rather than as the single point of information, planning, and job tracking.



KeyPlan is an outliner-driven project-management package. It's a good choice for managers and planners who want to work quickly. The lines in this network diagram indicate dependencies between the tasks. KeyPlan is smart enough to catch conflicts and warns you so you can make the necessary adjustments.

THE BOTTOM LINE KeyPlan is flexible and fast and should be a hit with project managers and executives who want to use their Mac to help them think. With its outlining metaphor, KeyPlan doesn't require the esoteric knowledge of project management that some bigger programs, such as Micro Planner, demand. But for serious project management, users will gravitate toward higher-end packages that offer accounting, variance reporting, and stronger information management.

— Ken Landis

Get Info

KeyPlan ★★★★

List Price: $395.
Published by: Symmetry Software, 225 E. First St., Mesa, AZ 85203; (602) 844-2199.
Version: 1.0.
Requires: System 6.0.2 or later.
Application Size: 685K.
Compatibility: Mac Plus or later.



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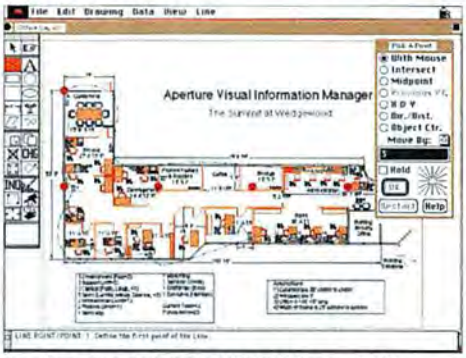
CAD

Aperture

A novel CAD/database hybrid is marred by interface and performance problems.

If good ideas were all that counted, Aperture would be the best-selling high-end drawing program of all time. The ideas are wonderful, and the feature list borders on brilliant.

But two things will keep Aperture from attaining the success its design would seem to foretell: The first is that Aperture just doesn't work very well. Simple things take too long or don't work at all. Too many choices are required before almost every action. Performance, even on a IIcx and on an SE powered by a Radius 25-MHz accelerator is, at best, tedious.



Aperture is a hybrid CAD/database application that takes a stubbornly un-Mac-like approach. Here, the line tool has been selected, but you have to make a selection from the pop-up box on the right before your mouse-up actions will produce anything.

The second major flaw is that Aperture is simply not a real Mac program. Sure, it looks like one, and some of the features work the way they're supposed to in a Mac program, but most features just go off on their own way. And *you* get to figure them out.

CAD MEETS DBMS Aperture links powerful drawing tools to a moderately powerful flat-file database, creating a combination that can be useful for people maintaining inventories, parts lists, and the like. It also is a boon to planners, who can draw projects and create the necessary database backup in one pass.

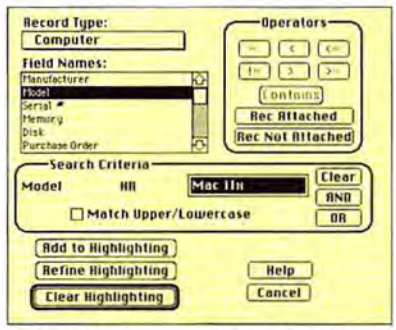
The drawing portion of Aperture supports color, automatic dimensioning and scaling, and many other useful CAD features. Your drawings can have up to 255 layers. Aperture lets users name views on the drawing, which is a nice navigational touch, but unfortunately there's no scrolling in the sense that any other Mac program interprets that term. That means that if you don't go to the trouble of creating lots of views, moving around on large drawings is very difficult.

I frequently had problems selecting particular objects. What works with virtually every other Mac drawing program simply doesn't work here. The manual actually brags that Aperture highlights things differently from other Mac drawing programs. Why? This difference is not a positive feature. There are lots of other examples of such idiosyncrasies. Drawing takes a while to get used to, because Aperture uses a mouse-up technique. You must click once to define the first end point of a line or shape and then click again for the second end point. In between you can zoom in or out (Aperture has extensive zooming abilities) or perform other actions. Colors also aren't handled in any familiar, standard way — for no apparent purpose.

The database is adequate for most project-management tasks. Any drawing element can be linked to a database record, and you can move between the two with just a click or two. You can import data from any comma- or tab-delimited file. Aperture allows you to select via database attributes, which is a powerful feature, but the dialog box for doing so is one of the most confusing ever seen on a Macintosh.

Once you've figured out how to print your drawings, you'll have few problems, but no one is ever going to call Aperture's printing speed anything but slow (although given the complexity of the files involved, that's hardly surprising). And the default printing size is rarely going to be the magnification you want. Database reports print well, although you don't have as much control over their appearance as you may need.

WRONG APERTURE It will take you a long time to learn Aperture because it insists on doing things its own, unique way. The developers never evidence more than a glancing acquaintance with the Mac interface. The 373-page manual is certainly extensive, but it's also poorly organized. It's possible that almost everything is covered, but several cover-to-cover readings haven't convinced me of that. There is a sort of on-line help, though. Whenever you select a command, a small help box appears at the bottom of the screen (it can be moved). However, even the verbose help there (the other option is terse help) is usually too single-minded and cryptic to be of much use. More extensive help is available via some dialog boxes, but you have to figure out how to access the boxes to use the help. You can't browse through help topics.



Aperture lets you select an object via its flat-file database. It's a powerful feature, but try figuring out this dialog box — where is the OK button? (Hint: the Clear Highlighting button is the default.)

THE BOTTOM LINE Aperture promises so much and delivers so little that I frequently wanted to scream at it. The only possible reason to use this version of Aperture is if you use your Mac for nothing else. Even then, it will be frustrating, and it's overpriced for what it offers.

— Steven Bobker

Get Info

Aperture ¥¥¥

List Price: $795.

Published by: Aperture Technologies, 84 West Park Place, Stamford, CT 06901; (203) 975-7587.

Version: 1.02.

Requires: System 6.0.3 or later and hard-disk drive; 2 megabytes recommended.

Application Size: 820K.

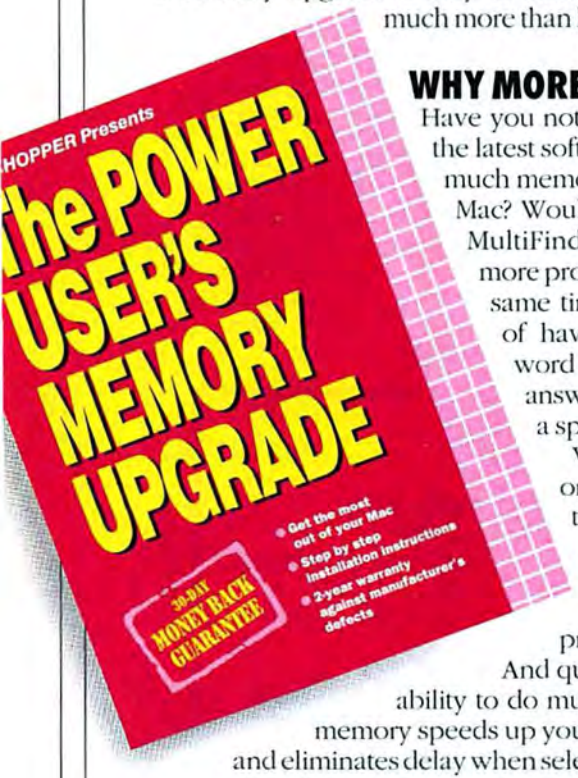
Compatibility: Mac II or later.

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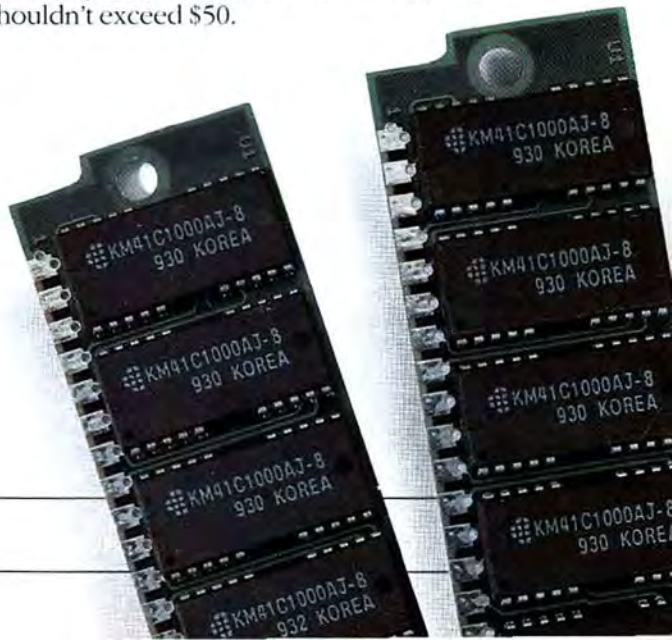
And quite apart from the ability to do multi-tasking, added memory speeds up your disk access time and eliminates delay when selecting menu items.

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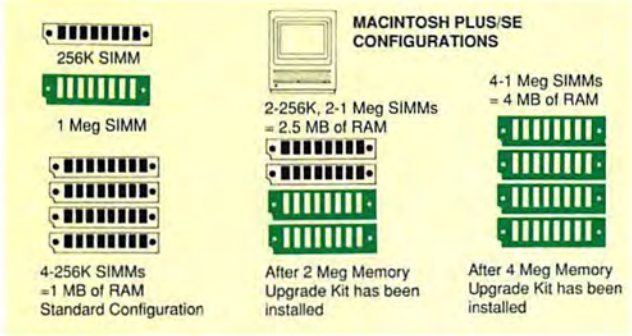


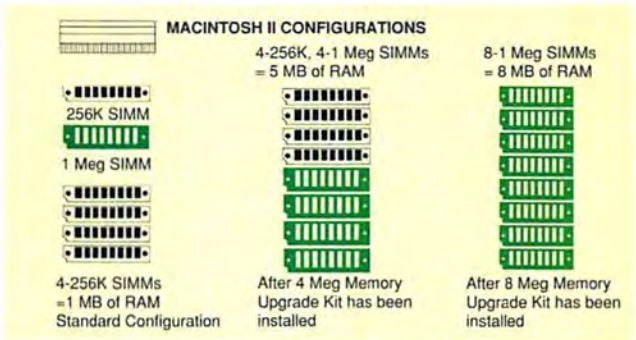
If you prefer, you can have a computer store install your SIMMs for you. Their service technicians have the necessary tools and expertise. The total cost shouldn't exceed $50.



The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs modules — totalling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs.

Replace two 256K modules and you will have a total of 2.5MB of memory. (That's the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you'll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)





The Mac II, IIx, IIcx and SE/30 each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4MB, 5MB or 8MB.

Remove the four 256K modules and replace with 1MB modules and you have 4MB. Leave the original modules and add four 1MB modules and you get 5MB. Removing the original modules and adding eight new 1 MB modules will bring you to 8MB of memory.

FAST, FASTER, FASTEST

SIMMs come in different speeds and are calibrated in nanoseconds (ns) from 70 to 120ns. Anything faster than 120ns doesn't much help any Mac but the IIci. The system doesn't respond any faster anyway. But you can always take your memory chips with you when you move on to a new Mac, so there may be an advantage to speed at a later date.



QUALITY CONTROL

MacShopper buyers and agents scour the world in search of top quality components for our SIMMs modules. They're supplied only by top grade manufacturers like Samsung, Siemens, Texas Instruments, Fujitsu, Intel, etc. Each unit is tested for performance, quality and noise, in temperatures from freezing to 158°F.

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*Check the chart for the number of modules you may need. Price and item availability are subject to change without notice.





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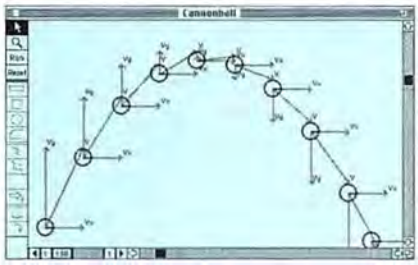
EDUCATION

Interactive Physics

Interactive Physics is the best physics-teaching tool you can get without a weightless rope, a frictionless pulley, and a monkey.

Interactive Physics is more like a tool than a textbook. It's the spreadsheet program of the Newtonian-mechanics world. With it, you can set up physical situations and see "what if?" scenarios, just as you would with a financial model in Excel or Wingz.

To let you do this, Interactive Physics provides a set of tools in a familiar tool palette for drawing simple two-dimensional objects (masses) and interconnecting them with massless strings, springs, or dampers. You can also apply constant forces and set such conditions as gravity, air friction, elasticity of objects, densities, and surface friction. Any object can be rotated and/or anchored to the screen



Interactive Physics is the best physics-teaching tool you can buy, letting you explore Newtonian mechanics without a lab bench. The parabolic flight of a cannonball, with velocity vector and components, is illustrated here. Object tracking (the multiflash strobelike effect) is turned on.

so that it becomes an immovable object during the simulation. Once your setup is complete, you simply click on the Run button and watch what happens. The objects move on-screen just as they would if you had set them up on a table in front of you (and you can even witness impossible simulations that require perfect vacuums, frictionless surfaces, and the ability to turn gravity off).

With all these calculations to complete, the program is no speed-burner on a Mac Plus. Knowledge Revolution has recognized this problem, though, and provided a simple and elegant solution: a "tape player" that records screens from the simulation into memory. When you've gone as far as you want (or reached a memory limit), you can stop the simulation and play back the recorded frames at a user-selectable rate.

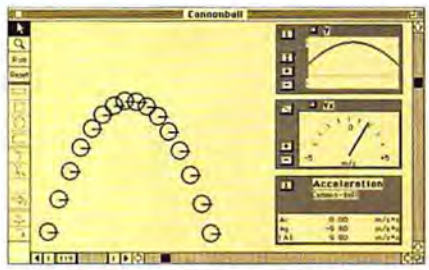
If that's all there were to Interactive Physics, it would still stand above the rest, but Knowledge Revolution has added the ability to monitor objects as they move and bounce. Every object can have its own set of vectors and meters that displays an amazing variety of data. Vectors display magnitude and direction of velocity, acceleration, and a variety of forces (with x-y components if desired). Meters — for everything from velocity to surface friction — are even more extensive. They can display their data as numbers or analog meters, or on a short strip-chart recorder that runs during the simulation.

Interactive Physics is also able to display multiflash strobelike images. All you need to do is select the number of simulation steps between "flashes," and the moving objects leave trails of themselves behind.

Interactive Physics comes with a well-written 103-page manual that is indexed and includes tutorials, reference sections, and technical information. An additional disk provides more than 50 well-organized demonstrations and experiments that are representative of those found in a good physics book.

PHYSICAL LIMITS The program is not without its limitations. For example, you can have only ten masses on the screen and they can be connected with a maximum of five strings, springs, or dampers. Furthermore, you can apply a maximum of only ten forces to objects, not including gravity.

Output is limited. You can't print screens unless you do a screen capture. And I'd like to be able to export my "tape memory" to animation programs such as VideoWorks and send my data to a spreadsheet. Masses can't overlap, so the only way to "pin" one object to another is with a string or spring. It would be nice to have multiple layers of objects that could be overlapped and fixed to each other with a pivot. Another limitation is the stick-



Interactive Physics lets you explore your scenarios in several ways. Here, the flight of a cannonball is tracked with three types of meters. The meters show Y-position (strip-chart), Y-velocity (analog), and Y-acceleration (numerical).

figure quality of the graphics.

The program is as crash-free as any version 1.0 I've used. It does, however, contain a nonfatal error that sometimes causes the meters to deliver erroneous readings. Knowledge Revolution knows of the bug and has promised a fix.

THE BOTTOM LINE Interactive Physics isn't cheap. Most universities and school districts may be able to afford it, but it's too expensive for most individual teachers or students.

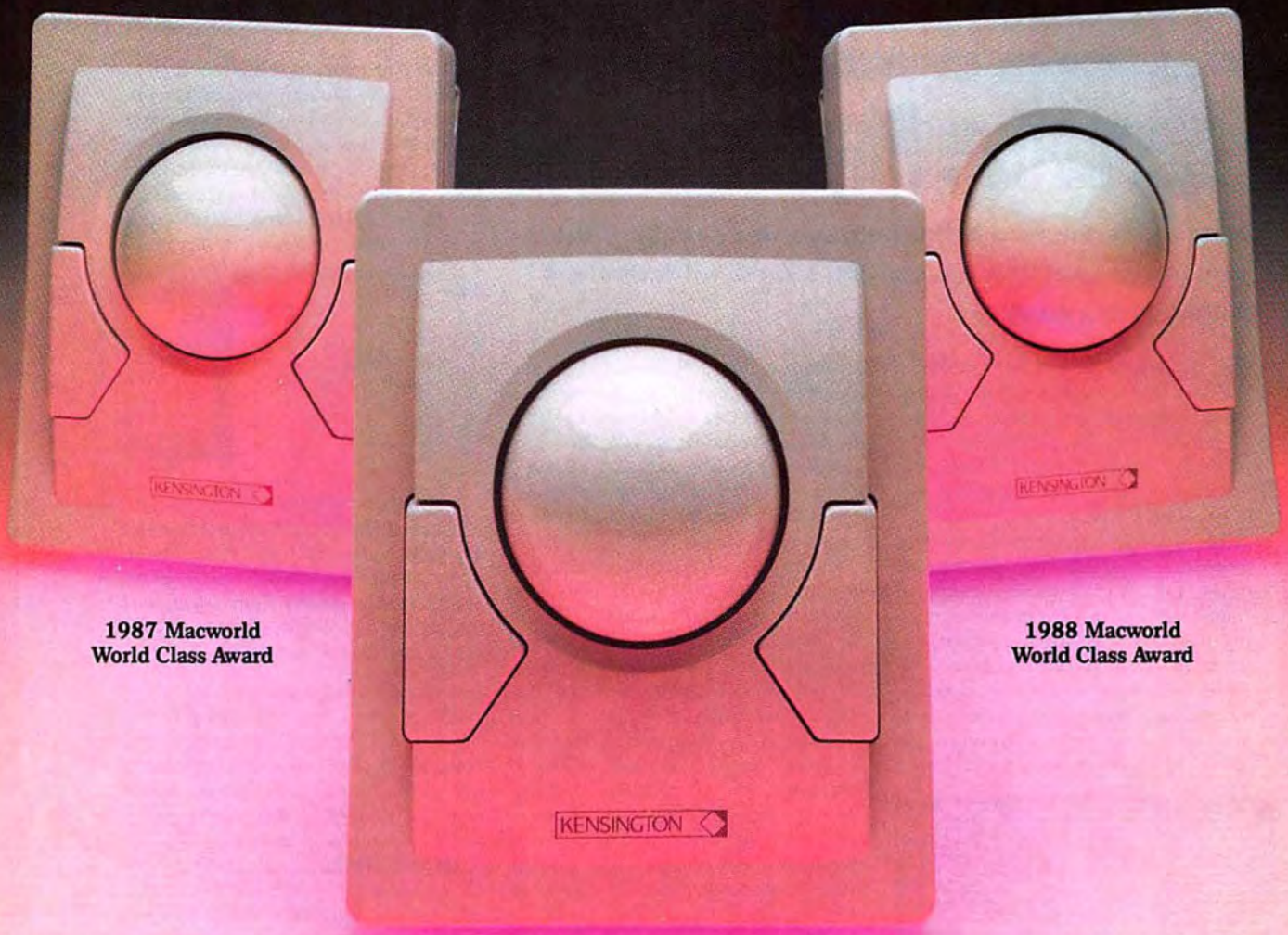
But if you've got the budget, when students ask those hard questions, you can answer them by *doing*. It's a physics teacher's dream come true.

— Ron Hipschman

Get Info

Interactive Physics

List Price: $449; educational price, $249.
Published by: Knowledge Revolution, 497 Vermont St., San Francisco, CA 94107; (415) 553-8153.
Version: 1.0.
Requires: System 6.0.3 or later; hard-disk drive recommended.
Application Size: 363K.
Compatibility: Mac Plus or later.



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DESKTOP PUBLISHING

The Art Importer

If you're into dingbats, The Art Importer will have you in font heaven.

It all started with Cairo. Not the city but the whimsical picture font that Apple provides with every Mac. Cairo showed us how marvelously convenient it is to "type" pictures instead of cutting and pasting them.

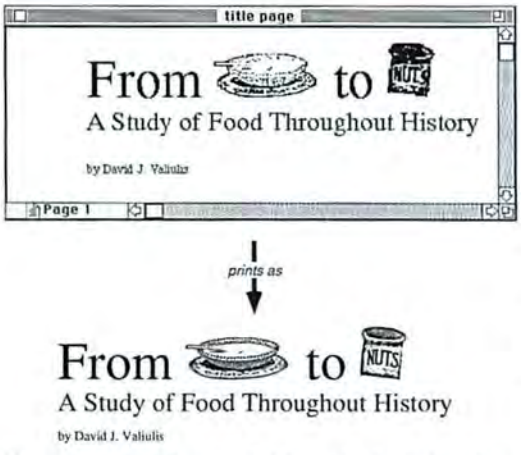
After Cairo came PostScript picture fonts such as Dingbats, whose little stars and arrows looked great at any size on a LaserWriter. But you still couldn't use your own artwork, such as logos and signatures. Until now. The next step has been taken, and that step is called The Art Importer.

WHAT IT IS The Art Importer is actually an upgraded and renamed version of the program formerly called KeyMaster. The Art Importer has one mission: to let you create custom picture fonts, using any PostScript artwork you want, including pictures you've created yourself. Artwork can be in PICT, PICT2, or EPSF formats only — no TIFF or bit-mapped files. (Note that bit-mapped PICT files, such as those created by Studio/8 or scanning software, won't work, and that EPSF files are supported only in Illustrator, FreeHand, or TypeStyler formats.)

There are several advantages to using artwork through a font instead of, for example, through the Clipboard. For one thing, it's convenient. Theoretically, you can have hundreds of different pieces of art in a single font that you choose from a font menu just as easily as typing ABC. This means that virtually every Mac program that uses fonts can now access PostScript artwork — even if the program can't ordinarily use such graphics. (Word, for example, can't use EPSF graphics but can use an Art Importer font.)

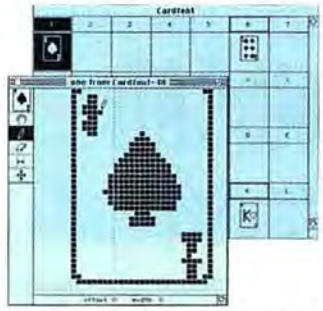
Another advantage to using artwork from a font is that the file size of the resulting document is smaller than it would be had the art been pasted directly. If you use lots of graphics, the savings can be substantial.

HOW IT WORKS When you create a new font, you see a window with 256 slots corresponding to all possible keyboard combinations. Select a slot, and then choose a picture to import into that slot. The Art Importer automatically creates a corresponding bit-mapped screen font (which you install in the normal way with the Font/DA Mover or a program such as Suitcase II) and a downloadable PostScript font (which goes into the System Folder). The Art Importer usually does a pretty rough job of creating screen fonts, so it provides a built-in bitmap editor. That's all there is to it. You can now type pictures in any application simply by switching to that font.



Here's an example of an Art Importer font at work. At the top is a screen shot from MacWrite II, showing a headline that uses an Art Importer font. Below the screen image is its actual output on a LaserWriter Plus.

The Art Importer 2.0 improves on KeyMaster 1.0 in several ways. First, it allows you to import up to 256 pieces of art instead of only 16. (But be warned: Fonts with a lot of pictures can easily overrun the memory of most PostScript printers, causing the printer to either reset or abort the print job.) Second, unlike KeyMaster, which allowed you to use color artwork only from FreeHand, The Art Importer supports any color art — but it is still only for output (all art appears in black and white on-screen).



The Art Importer, the upgraded version of KeyMaster, lets you create fonts out of graphics. The cards in this font were scanned from a real deck and then turned into Illustrator artwork with Streamline. The graphics were then imported directly into The Art Importer, which automatically created both screen and PostScript fonts.

The Art Importer comes with seven sample fonts of about 80 clip-art images. Another plus is a separate version of the program (you have to pay $10 for a special disk) that's optimized for Macintoshes with a math coprocessor; importing art with this version is more than four times faster than it is with the regular version.

THE BOTTOM LINE The Art Importer isn't for everyone, but if you find yourself needing quick and convenient access to PostScript art in a variety of applications, you'll find The Art Importer virtually indispensable.

— Dave Valiulis

Get Info

The Art Importer

★★★★½

List Price: $179.
Published by: Altsys, P.O. Box 865410, Plano, TX 75086; (214) 424-4888.
Version: 2.0.
Requires: System 4.2 and Finder 6.0 or later.
Application Size: 309K (289K for math-coprocessor version).
Compatibility: Mac Plus or later.

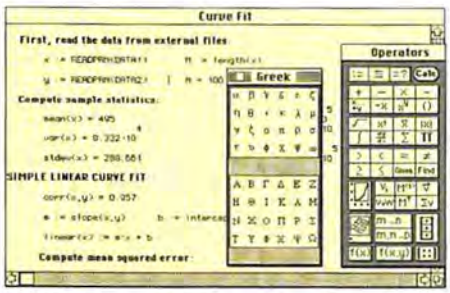
MATHEMATICS

MathCAD

MathCAD is a solid — if quirky — math processor for professional equation solvers.

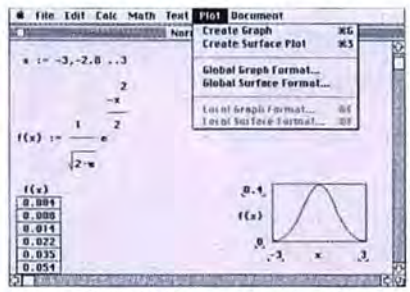
First and foremost, MathCAD is an equation solver (and *isn't* a CAD package). This means that you simply define variables and enter them into an equation, and MathCAD calculates the solution. Change the values of the variables, and you get the revised solution. You say you need to solve for unknown variables? No problem, MathCAD can handle it. In fact, MathCAD easily handles derivatives, integrals, complex numbers, matrices, iterative calculations, and much more. MathCAD also provides a wide range of built-in functions — from statistics to Fourier transforms. Special Until and If functions even permit conditional-type decision-making.

MATH APPEAL MathCAD is also a capable charting program. When you're finished with your calculations, MathCAD can plot the results for you — with two- or three-dimensional graphs. MathCAD also creates tables and can even import data that's been saved in ASCII from other applications, which can be handy when you're working with large data sets. Whatever your equation-solving demands, MathCAD is likely to meet them. If it can't, then you probably want a more symbolic-oriented program such as Mathematica.



MathCAD is a solid, if occasionally awkward, equation solver. Its two tool palettes make it easy to select any of its mathematical operators or any Greek symbol with just a mouse click.

Still, what you will probably notice first about MathCAD is not its math capabilities but its smooth, interactive "live-document" approach. Unlike similar programs, such as Eureka: The Solver or TK Solver Plus, MathCAD does not require separate input files and output windows or separately constructed printed reports. Everything is handled within a single interactive document. Variables are defined (either locally or globally) as soon as you type them. Equations are solved as soon as you press the equal key, and changes anywhere in the document update all affected expressions. Error messages are easy to understand because they always appear next to the offending statement. And the screen display is WYSIWYG, with all elements of your equations appropriately sized and located.



Access MathCAD's graphing functions through the Plot menu. This document contains a simple normal-curve plot generated by the formula at left.

Generating a report is as simple as printing your finished document, because MathCAD doubles as a specialized page-layout program. Text can be separately entered and formatted, much as in a word processor. Graphs can be resized. All elements (equations, text, and graphs) can be independently moved around within the document. Thus, although you can use MathCAD simply as a quick-and-dirty equation solver, you can also use it to produce a finished manuscript.

The manual is clearly written, given the complexity of the program. This is a definite plus, as you will probably need to refer to the manual regularly. On-line help is available, but it is not adequate until you've become familiar with MathCAD. Unlimited toll-free technical support is also provided.

MATH ANXIETY Despite all this praise, MathCAD does have some notable drawbacks. One of these is that users accustomed to the Mac interface may find that the entering and editing of equations is far from a routine matter (maybe this is a carryover from the program's MS-DOS ancestry). For example, if you want to type the series of dots that define a range variable (1 . . . 10), you must type a semicolon rather than the dots themselves. MathCAD does offer an alternative (an operator palette from which you can make a selection by clicking), but the basic awkwardness remains. Similarly, correct formatting often requires using parentheses, even though they don't appear on-screen. Procedures to delete or select parts of equations are frustrating and do not follow Mac conventions.

At times, MathCAD does not properly update the screen's appearance. The manual acknowledges this problem and instructs you to select the Redraw command when it happens. This is a flaw in the program's design, and users should not have to provide the solution. Furthermore, MathCAD almost demands a math coprocessor to achieve reasonable speed. Recalculations can make just scrolling through a document almost impossible.

THE BOTTOM LINE MathCAD's primary appeal will be to professional mathematicians and engineers. Its WYSIWYG equation formatting, text handling, statistical functions, financial functions, and graphics capabilities are limited compared with those offered by programs specializing in these separate tasks. Still, if equation solving is your focus, it will be convenient to have at least adequate capabilities in all these areas combined into one program. With its easy-to-use interactive documents, MathCAD joins the front of the pack of math software.

— Ted Landau

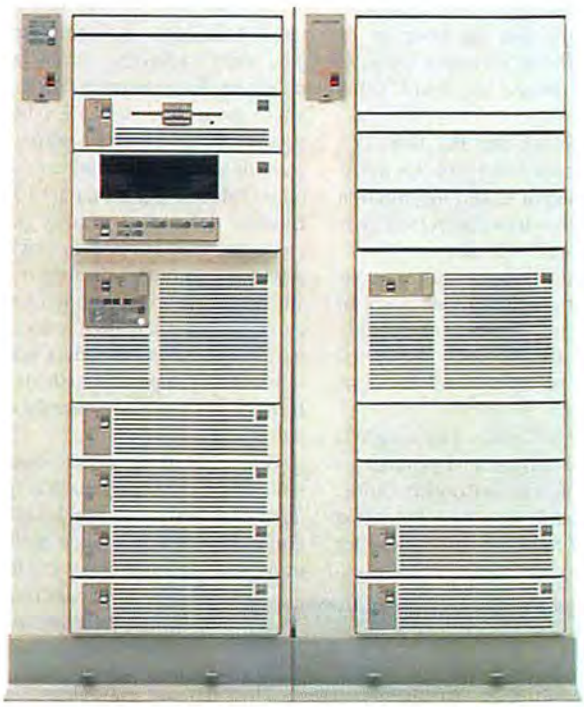
Get Info

MathCAD

★★★★

List Price: $495.
Published by: MathSoft, One Kendall Square, Cambridge, MA 02139; (800) 628-4223.
Version: 2.02.
Requires: System 6.0.2 or later; hard-disk drive and math coprocessor recommended.
Application Size: 428K.
Compatibility: Mac Plus or later.

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Up to Date

Changes New and Noted

FREEDOM OF PRESS, the PostScript translator and winner of multiple Eddy awards, saw its first upgrade out the door just as our review in the January '90 issue hit the streets. Version 2.1a can now be selected in the Chooser, making it usable with more than 50 printers and film recorders. The new version also includes a spooler that eliminates the awkward print-interrupt command in the previous version. The spooler also lets you access Freedom of Press over an AppleTalk network. $495; upgrade, $45 — free if version 2.1 was purchased after October 1, 1989. Custom Applications, Building 8, 900 Technology Park Drive, Billerica, MA 01821; (508) 667-8585.

CANOPENER, the Eddy-award-winning universal file opener, has been tweaked with its first upgrade. Version 1.1 boasts 200-to-300-percent faster searching; support for TIFF, RIFF, and MacDraw II formats; direct printing; and the ability to move information in found files. $125; upgrade, free to registered owners. Abbott Systems, 62 Mountain Road, Pleasantville, NY 10570; (800) 552-9157.

MACSCHEDULE, the Gantt-chart maker from Mainstay, is now in version 2.0, and it includes an integrated spreadsheet program and up to 24-bit color. Data can be imported and exported in tab-delimited format as well as graphed and manipulated on the same page as a Gantt chart. Other enhancements include multiple windows and linked files, stationery files for creating standardized formats, and chart sizes up to 8 x 8 pages. $245; upgrade, $30 to registered owners. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; (818) 991-6540.

VOYAGER, the Eddy-nominated desktop planetarium, is now in version 1.2. Just a few of the enhancements include the ability to select your observer position by clicking on a globe of the earth; custom horizon lines that match your observation location; the capacity to search for conjunctions of the planets, sun, and moon over time; the ability to observe a solar eclipse from the moon; and a 3-D perspective view of the stars within 30 light years of the sun. $124.50; upgrade, $30 plus shipping to registered owners. Carina Software, 830 Williams St., San Leandro, CA 94577; (415) 352-7328.

HYPERMEDIA

Guide 2.0

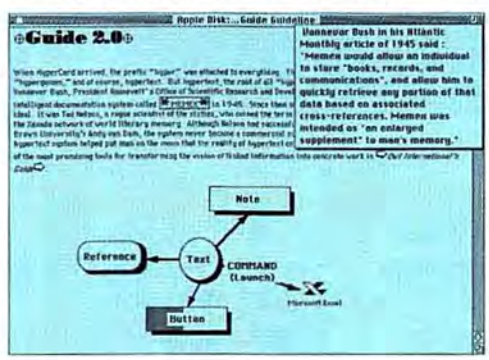
Guide 2.0 is a true hypertext tool that lets you create associative documents.

When HyperCard arrived, the prefix *hyper* was attached to everything. Suddenly there were hypermedia presentations; hypergames; and of course, hypertext. But the concept of hypertext, the root of all hyper technology, has been around for some folks since 1945.

On the Macintosh and the IBM PC, one of the most promising tools for transforming the vision of linked information — true hypertext — into concrete work is OWL International's Guide.

WHAT IT IS Guide is a hypertext-construction kit. Any text you can think of can be placed into Guide's surprisingly Spartan surroundings. Once there, the text will never be thought of the same way again.

Although HyperCard is a hypermedia product, it is not a hypertext product — it's a personal-information tool kit. Guide, on the other hand, is a true hypertext environment. You do not use Guide for building checkbook balancers or to-do lists; you use Guide to retain knowledge in electronic form.



Guide is a hypertext-construction kit that lets you create associative documents. Notes in Guide documents can be used to annotate specific words, passages, or graphics. Here, clicking on the word MEMEX brings up an explanation. The graphic was created with Guide's Scribbler DA, and all the objects can be used as hot spots that link them to notes or commands.

The hypertext workings of Guide revolve around three basic metaphors: the note, the reference, and the button. Notes are Guide's way of popping up information that might not be directly visible. Notes serve as wonderful annotation devices in a hypertext document. A special kind of note is the command. Commands can launch applications or send/receive data from the serial port. OWL promises other external commands in the future.

My most frequently used Guide function is the button. Buttons are single words or sections of text that hide other sections. Headings can completely disappear when clicked on or may be retained on-screen for reference. Because I do a lot of procedure writing, I hide whole sections of text under headings where I can find them again. Buttons can be combined into inquiries that act like menus. Buttons defined as inquiry groups become mutually exclusive, so when one is selected, the others disappear. Inquiries and buttons make documents much less cumbersome than their paper counterparts. With Guide, readers need peruse only what is important to them. Other information stays conveniently out of the way.

But what if a reader wants to see something the designer has purposely deemphasized? For the brutish reader, Guide provides reference points, which transport you from one section of text to another or access the disk and open linked documents. Guide's reference points are the hypertext feature that most mirrors the sense of associative linking that we recognize in our own mental processes.

All these metaphors are implemented directly in the text. A reader can identify buttons, notes, or reference points by looking at the screen for differing text formats or by moving the cursor. When the cursor encounters a hypertext link, it turns into an asterisk for notes, an arrow for reference points, or a circle with cross hairs for buttons. A backtrack icon is available on the right scroll bar so you can retrace your last few commands.

For users who need graphics

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All of which is good news indeed for anyone who works with large spreadsheets, sophisticated graphics or other data-intensive applications.

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AD# 021044

in their text, Guide even comes with its own MacDraw-like DA called Scribbler. Although any graphic that can be cut and pasted through the Clipboard can be placed in a Guide document, it's best to use Scribbler for developing graphics. When images are transferred from Scribbler to Guide, they retain their object orientation so that individual portions can be turned into buttons, notes, or reference points. If you use other graphics packages, Guide provides invisible buttons that can be overlaid on the graphic as anchors for your hypertext links.

Guide is not without faults. I'd like to see multiple fonts and styles in single nodes of text, and tools to help index multiple selections of the same links automatically. For example, if you're creating a definition for ROI (return on investment), Guide should be able to automatically link all occurrences of a word to its definition.

The features of this program are all excellent and work flawlessly. OWL now needs to concentrate on developing hypertext-building tools such as keyword extract lists, automatic indexers, and searches of multiple files (either open or unopened).

OWL also offers a conversion utility that turns Macintosh outlines into files that work under Guide for Microsoft Windows. Not only does this conversion utility work great, but it also has the advantage of making black-and-white Macintosh graphics accessible under Microsoft Windows. I work in an environment in which the Macintosh isn't the favored machine, so I develop Guidelines on my Macintosh and deliver them on the PC. And that makes everybody happy.

— Daniel W. Rasmus

Get Info

Guide
$$$$

List Price: $295.
Published by: OWL International, 2800 156th Ave. S.E., Bellevue, WA 98007; (206) 747-3203.
Version: 2.0.
Requires: Two 800K drives, hard-disk drive recommended.
Application Size: 382K.
Compatibility: Mac Plus or later.

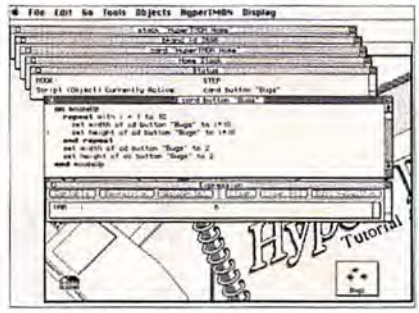
HYPERCARD

HyperTMON

This first HyperCard debugger is good, but it still needs work.

Serious programmers cherish their debuggers as much as miners value their helmets. HyperTMON, the first debugger for the HyperTalk language, will win the affection of many, but others are going to find it only moderately illuminating.

A debugger is a tool that examines the operation of program code and tracks down programming errors in the process. HyperTMON performs in two primary ways: as an enhanced script editor and as an instruction-by-instruction script executor. Products such as ScriptEdit (see review, February '90) have better editing capabilities, but HyperTMON's ability to run specific lines of code while examining variable and expression values puts it in a class by itself.



HyperTMON, the first HyperTalk debugger, lets you have numerous script and observation windows open simultaneously. The small arrow in the active window points to the instruction currently being executed. The current value of the variable *i* appears in the Expression window.

WHAT IT IS HyperTMON is an XCMD extension to the HyperTalk language. An installer stack that comes on the HyperTMON disk lets you install and remove the XCMD from either the Home stack, preferably, or the HyperCard application itself. Once installed, HyperTMON is available from any other stack via two menus, HyperTMON and Display, which are automatically added to the stack's menu bar.

From the Display menu, users can choose to open multiple windows containing any script of the current message hierarchy. All button, field, card, background, and stack scripts can be accessed from hierarchical menus. Menu items use italics and leading symbols to indicate whether an object has a script and is visible. Unfortunately, only one script from each level of the message hierarchy can be on-screen at a time.

From the HyperTMON menu, users access the powerful instruction-execution tools, including commands for stepping, tracing, executing a selection, and controlling breakpoints. Following in the footsteps of Think Technologies' innovative MacPascal language, HyperTMON lets users see the progress of running HyperTalk code by showing the code and the on-screen results simultaneously.

HOW IT WORKS The Step command executes a single instruction line contained in the script-editing window. An arrow symbol marks where the step is occurring. Choosing the Step command once more executes the next line of code, and this drops the arrow symbol down to the following instruction.

The Trace and Execute Selection commands work similarly. Trace executes an ongoing series of Step commands that continues until you stop the trace by choosing the Abort command or until the word *Break* occurs within the script. The Execute Selection command traces only the currently selected portion of a script.

The programmer can also place the word *Break* anywhere in the code to stop the Trace command. Two additional breakpoint commands automatically activate or comment-out occurrences of breaks within the script.

One great advantage of instruction-by-instruction script execution is that it helps correlate what the code says with what the screen shows. Even more valuable is the ability to evaluate the components of the code — the variables and expressions that change in value as a program operates. HyperTMON offers evaluation windows so that as you step or trace through a program, you can watch the values of variables and expressions. You can even instruct the program to stop

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execution if specified criteria are met.

HyperTMON has many nice touches. For example, it can be set to open closed scripts to find the appropriate handler. You can accelerate card navigation, which is slow because of the updating of the display menu, by specifying manual updates. Trace speed can also be set. Finally, scripts can be formatted so that control structures appear in boldface.

HyperTMON's manual is adequate though uninspiring. A tutorial stack and a demonstration stack are a help to first-time users.

Now a few words on the downside: HyperTMON doesn't step or trace comfortably through all HyperTalk code. For example, if you're tracing through a mouseUp handler, HyperTMON produces error messages when lines of instructions refer to "me" or "the target." These same lines operate correctly when a real mouseUp event has initiated the handler.

Other HyperTMON incompatibilities also result in error messages, even though HyperTalk alone would have run smoothly. HyperTMON requires the Put command to specify a container, whereas HyperTalk defaults to the message box. Users may find that a significant portion of their scripts will need modification — which tends to defeat the purpose of a debugger — if they're to trace freely.

THE BOTTOM LINE With a version or two of fine-tuning, HyperTMON could broaden its appeal from that of a clever but problematic debugger to that of a fine programming-education tool. However, it has a long way to go to rival its cousin TMON as a true programmer's tool.

— Scott Kronick

Get Info

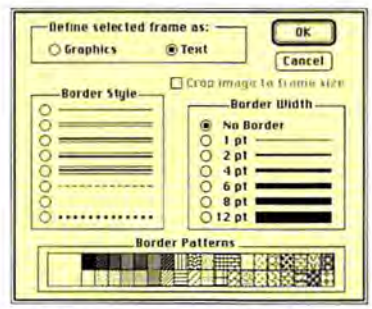
HyperTMON
★★★½
List Price: $99.95.
Published by: ICOM Simulations, 648 S. Wheeling Road, Wheeling, IL 60090; (708) 520-4440.
Version: 1.0.
Requires: HyperCard and System 6.0 or later; more than 1 megabyte of RAM strongly recommended.
Application Size: 168K.
Compatibility: Mac Plus or later.

DESKTOP PUBLISHING

Springboard Publisher II

A poorly designed interface and weak feature set knock Springboard Publisher out of even low-end-DTP contention.

Springboard Publisher II, an upgraded version of Springboard Publisher (see Desktop Reviews, May '89), addresses only some of the earlier version's failings and adds a few new ones. It's aimed at desktop publishers who produce occasional fliers and newsletters — not at professionals. Word-processing, graphics, and page-layout tools are all included, as is a special version of SmartArt with six of Volume 1's 15 effects (see reviews, October '89 and January '90). Springboard Publisher II is capable of doing this sophisticated work, but it suffers from a clunky, distracting interface, and like a certain brand of catsup, it's s-l-o-w — even if you're using a 68030-based machine.



Springboard Publisher II is a slow and awkward low-end page-layout package. This dialog box pops up every time you create a new frame. Although the dialog box remembers the last settings, Springboard's use of a dialog box instead of a palette tool can really slow you down.

HOW IT WORKS Like most DTP applications, Springboard Publisher puts text and graphic elements into frames. Unlike other DTP programs, it has no tool palette from which to choose the pointer, I-beam, text, or graphic-frame tools. To create a new frame, you must deselect everything on the page and then click and drag to draw a box. A dialog box appears in which you specify the thickness and pattern of its border and whether the box will be a text or graphics frame. To select a frame for resizing or moving, click once within it to make the cursor change to a four-way arrow.

If you double-click inside a text or graphics frame, you will be in editing mode. In a text frame, the cursor will change to an I-beam. Double-clicking on a graphics frame that contains a bit-mapped graphic brings up standard tool and pattern palettes that look identical to those in the original MacPaint. If the frame contains a PICT or EPSF graphic, double-clicking on the frame brings up a different tool palette that permits only moving, resizing, or auto-flowing text around the graphic. Clicking outside the frame makes the tools disappear. Having to remember how many times and exactly where to click is distracting.

Every page has a background text frame equal to the image area of the page; any frames you draw lie on top of it. This arrangement eliminates the need to draw a frame for body text. Body text goes into the background frame directly. This convenience creates a problem, however. To deselect everything on a page (as you must to draw a new frame) you can click only in the margins. Clicking within the image area selects the background frame.

WHAT'S WRONG Springboard Publisher II supports actual-size, 200-percent, fit-in-window, facing-page, and thumbnail views. But you can enter and edit text only in the actual-size view, either directly in text frames or in the faster "typing window," which feels like a separate word processor. You'll need that separate typing window — especially if you're using a standard Mac Plus or SE. While I was editing text within a text frame in a one-page document on my Mac IIcx, there was a perceptible pause before each letter appeared on-screen. Using the typing window was faster than editing text in the text frame; still, my experience with this application (especially when flowing text through a 24-page document) made

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MU 4/90

PageMaker seem spritely.

Springboard Publisher's word processor feels like Word 3.0. Only left tabs — with dot, dash, underline, or blank leaders — are supported. The inability to specify center, right, or decimal tabs limits the text-formatting possibilities. However, a spelling checker and a thesaurus are built in. Springboard Publisher II imports Word (even 4.0), Works 2.0, WriteNow 2.0, MacWrite, and text files, as well as MacPaint, FullPaint, PICT, and EPSF graphics.

Four font sizes (9-, 10-, 12-, and 14-point) and several styles are available as direct choices on the Font menu. Springboard Publisher II supports font sizes from 4 to 127 points and many more styles in the Font Format dialog box. It's counterintuitive to have two places in which to specify the same attributes — despite what Microsoft might say.

You can search for and replace strings of text, but not fonts and sizes. Automatic text wrap around irregularly shaped objects is easy. Kerning and leading are supported in 1-point increments. That's adequate for amateur users, but the minimum ruler division of one-eighth inch is too coarse even for them. There is no support for color or high-resolution bitmapped graphics.

THE BOTTOM LINE Although the list price of only $195 makes Springboard Publisher a must for occasional desktop publishers (Publish It!, the nearest price competitor, costs twice as much), occasional users shouldn't have to adjust to the interface or wait for the slow performance. If you need more than basic desktop publishing, get a real DTP application.

— Darryl Lewis

Get Info

Springboard Publisher II

List Price: $195.
Published by: Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435; (612) 944-3912.
Version: 2.0.
Requires: System 4.2 or later and two 800K floppy drives or a hard-disk drive.
Application Size: 625K.
Compatibility: Mac Plus or later.

GRAPHICS

Azimuth

Azimuth tries to take mapmaking to new heights, but export problems and its interface weigh it down.

You'd think that by now someone would have developed a really great mapmaking program that could generate high-resolution maps in Illustrator format. You could create your maps in program X and then bring them into Illustrator or FreeHand (both of which can read Illustrator-format files) to enhance them.

Azimuth, a new release from Graphsoft, solves some problems, doesn't address others, and creates a few new ones.

MAPS FROM SPACE Imagine yourself in a spaceship above the earth. You can zip to any point on the globe and hover at any altitude. You can look in any direction and take a picture of the visible portion of the earth, placing any point in the center of the picture. The maps you would draw by tracing the shapes on these pictures (adding national borders) are the maps you can produce with Azimuth. The program takes a little getting used to, but it's incredibly powerful. In addition, you can plot the horizon line and a grid of latitude and longitude lines on your maps.

Azimuth comes on a set of six disks, which contain the program and a (nearly) complete set of outlines of the world (by country) and the United States (by state). The thoroughness and detail of these map outlines are the best I've seen in any Mac program — a fact that makes the omission of certain details, such as the Florida Keys and some of the country files referenced in the tutorial, a mystery.

Azimuth also contains a sophisticated drawing environment, with not only the standard MacDraw-like tools (lines, ovals, rectangles, and polygons) but also CAD-type tools such as a fillet tool. You can save shapes you draw in Azimuth as symbols in a symbol library for use on multiple maps. And you can import PICT files from, for example, a scanned image and trace your own map outlines with Azimuth's drawing tools.

BACK TO EARTH So what are the problems? Two things. First, the user interface is weak, particularly the menus. They are poorly organized and even more poorly named. The worst examples are the style, size, and font menus, which, to conserve space, are labeled, respectively, *T*, *ex*, and *t*. Ugh!

Secondly, Azimuth can save documents in PICT format but not in Illustrator format. Furthermore, the PICT format in which it saves cannot be read by the DrawOver program that comes with Illustrator. (DrawOver converts PICTs to a format that can be read by Illustrator or FreeHand.) To get an Azimuth map into Illustrator, you must first open the Azimuth PICT in an object-oriented program such as MacDraw, resave it in PICT format, and then convert it with DrawOver.



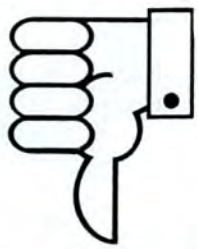
Azimuth is a solid mapmaking program that lets you create maps of the earth from any point in space. This is a view from 1,500 miles above *MacUser*'s Foster City, California, office. Azimuth produces the best-looking maps of any Mac application to date, but it suffers from interface problems and offers a too-limited selection of export formats.

Two hints: (1) Don't fill objects in Azimuth if you're going to convert to Illustrator. Each Azimuth object converts to two PostScript objects, one for the outline and the other for the fill. Draw in Azimuth with No Fill selected, and group objects to make them easy to select and

Read It And Reap.

Memo To: Mac people who would like to write better
From: Ken Dickens, ad writer
Re: A great new product, a helpful book, and a contest to get both ***FREE***

I'm a skeptic. So when the people at Reference Software told me Grammatik Mac could improve my writing, I said, "Right." Faster, fontier, or even bolder I could believe, but better? Give me a break. I thought, if it was real good, it might help business people write better letters or memos.



Then again, I do this for a living (not a bad one I might add). So if software can improve my writing, it's fantastic. And I'm not.

Well, two weeks and a whole lot of humble pie later, I'm here to tell you that Grammatik Mac is nothing like those desk accessory style checkers you might have tried. Believe me, it's like an English professor in a box. The thing actually proofreads each sentence and breaks it down into parts of speach. It's scary, remember sentence diagramming? Well, that's basically what it does right on your screen.

I guess that's how it knows if subjects and verbs are in agreement. Prepositions are dangling. Plurals should be possessive. All that stuff I can never remember and have to look up. For example, Grammatik might stop on a sentence like "I feel I should have won the Grammatik Mac Contest, its a real shame", tell you that "feel" is probably incorrect, suggest "think" instead and by the way, "its" should be "it's ." You can ignore the suggestion and move on (which is what I usually do, making the excuse that it's my writing style) or change the offending phrase right then and there. I like that. It lets me fix my mistakes without cramping my style.

Grammatik Mac catches errors like incomplete sentences, improper use of homonyms (like "their" instead of "there"), split infinitives, noun/modifier disagreements, passive voice, and etc. It even flags unbalanced punctuation, transpositions (like form instead of from, capitalization errors, and thousands of others I've never even heard of.

So, what's it done for me? Nothing short of making my writing better. And the more I use it, the fewer mistakes it catches (could I be learning something here?). Anyway, I'm happy to report that I I almost never write in passive voice, that I've solved my its/it's problem, yet I still split lots of infinitives. And I always start too many sentences with and. . . but, that's just my style.



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Ken Dickens

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	Forecast	$6,453	$8,800	$10,050	$9,460	$12,000	$18,900
	Variance	$1,947	$3,500	$3,850	($760)	$1,000	$2,400
	%	130%	140%	138%	92%	108%	113%
Cost of Goods Sold	Actual	$1,848	$3,198	$3,475	$2,262	$2,860	$7,663
	Forecast	$1,549	$2,288	$2,312	$1,608	$2,640	$3,969
	Variance	$299	$910	$1,164	$654	$220	($3,969)
	%	119%	140%	150%	141%	108%	0%
	Gross Profit	**$6,552**	**$9,102**	**$10,425**	**$6,438**	**$10,140**	**$21,300**

WxC 1000

		JUL	AUG	SEP	OCT	NOV	DEC
Revenue *(In Thousands)*	Actual	$2,184	$3,198	$3,892	$2,610	$4,030	$5,325
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MEMO:

TO: *Shannon Pitts*

FR: *Peter Cohen*

DT: *November 13th, 1989*

RE: *Presentation to the Board*

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

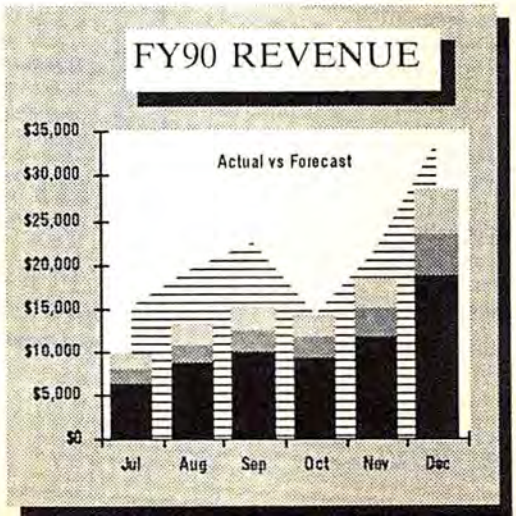
To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

And our assembly resources here in the

WxC 2000	JUL	AUG	SEP
Revenue *(In Thousands)*			
Actual	$8,400	$12,300	$13,900
Forecast	$6,453	$8,800	$10,050
Variance	$1,947	$3,500	$3,850
%	130%	140%	138%

With a very respectable 9 percent share after only 18 months, we feel we can reach 15 percent by the end of the next fiscal year (see six month projection).



fill later in Illustrator. (2) If you don't have MacDraw and Illustrator, you can open an Azimuth PICT directly from FreeHand, which converts it automatically to FreeHand format — but you'll still have trouble with fills no matter what you do.

The tutorial is reasonably good and worth working through. The rest of the manual does an adequate, but not great, job of describing some difficult and subtle concepts. You'll learn more by fooling around with the program for an evening or two, with occasional references to the manual for hints. Although there is neither a phone number for technical support nor any other reference to it in the manual, a company representative said that this was an oversight and that all registered owners can get free technical support by phone.

We talked with the people at Graphsoft at some length about the hassles involved in getting a file into Illustrator and about their approach to menus. They told us that they're working on both problems, but it's not clear how much they'll be able to improve in the next version. Meanwhile, they are actively supporting their geographic data.

THE BOTTOM LINE At $399, Azimuth is a solid value, a high-performance application that makes some of the best Mac maps around. Despite its shortcomings (which knock its mouse rating down), its quirky interface, and all the hoops you have to jump through to use its maps with Illustrator or FreeHand, you will want to have this program in your collection if you make maps.

— Henry Bortman

Get Info

Azimuth

★★★½

List Price: $399.
Published by: Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043; (301) 461-9488.
Version: 1.0.
Requires: Hard-disk drive recommended.
Application Size: 378K (more than 3 megabytes with all data files loaded).
Compatibility: Mac Plus or later.

Rumor Manager

Gossip, Guesses, and Goings-On

A Silicon Valley company best known for its innovative and award-winning utility software (not to mention the flamboyant personality of its former CEO) is about to introduce a radically different sort of hard-disk-drive controller. The soon-to-be-released YMM series will change the way hard-disk-drive designers look at these things.

In an effort to reduce congestion in the Cupertino area, Apple is starting to move entire divisions elsewhere. A substantial part of the public-relations operation will soon be based near Boston (there's a lot of space available on Route 128) so that news can get out without the PR folks' having to get up in the middle of the night to post press releases before the stock market opens. Evangelism, which has had its ups and downs recently, is about to have another down: down to Austin, Texas, to be exact.

The current clip-art boomlet will continue unabated. The amount of clip art now available is still growing. In fact, it's growing faster than Mac sales. Since hand-held scanners were such a popular Christmas present this past December, look for even more clip art.

That brings up a less pleasant subject. Commercial clip art generally is original work and doesn't violate copyright laws, but a great deal of "public-domain" clip art (estimates range up to 75 percent) consists of scanned copies of other people's copyrighted work. This is at best illegal, and always immoral, and yet the practice is widespread. (Check out any bulletin board or user-group library to see exactly what we are talking about.)

Several magazines and free-lance photographers have banded together to fight this practice. They plan to bring legal actions against both the creators and distributors of this stuff, and they'll be asking for damages. The first suits should be filed any day now.

The much delayed, problem-fraught Tandy/Radio Shack project has changed direction. Radio Shack has given up on its legal battle to be allowed to do a Mac II clone (who would buy a Mac II clone today, anyway?) and just recently put the final touches on a contract with Apple to produce the upcoming new low-end Mac. Having Radio Shack produce the low-end Mac will save Apple a lot of money, so the price can be low. And since Radio Shack has a lot of excess computer-manufacturing capacity in this country, it can be "Made in the USA" — a definite plus for Apple. The deal, which may have been signed by the time you read this, gives Apple a six-month exclusive right to sell the machines and then lets Radio Shack outlets throughout the world sell the unit. The machine's name, at least as far as the contract is concerned, is the Macintosh RS. RS has variously been interpreted as *Real Small* or *Radio Shack*.

The Macintosh RS, a.k.a. the Mac Puppy, will have a 68030 coprocessor and 2 megabytes of memory and will *not* be expandable. If you thought the old 128K Macs were hard to get into, wait until you try to crack this case. When it ships this summer, the Mac Puppy will come with System 7.0 — if System 7.0 is available by then.

Speaking of co-ventures, Apple has been huddling with one of its mainframe partners about the construction of a Mac workstation, but so far the project hasn't taken off. The development teams aren't getting along as planned, and things have bogged down. If the disputes can't be settled quickly, Apple may bail out.

Heard any good rumors lately? If we use your rumor, we'll send you a token of our appreciation and promise not to use your name. Anonymous contributions are also accepted.

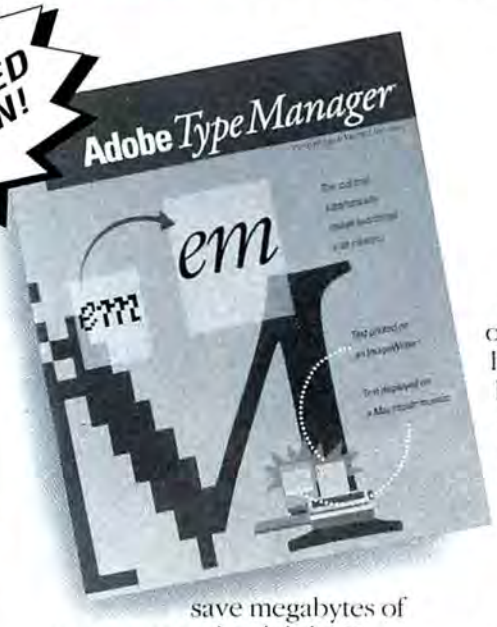
■ ■ ■ ■

Our U.S. Mail address is Rumor Manager, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail), 70411,204 (on CompuServe), and MacUser.Edit (on AppleLink). No calls, please.

Introducing the New, Improved Adobe Type Manager $59.

Plus Three *New* Adobe Products*!

NEW IMPROVED VERSION!



Now you can get the **new edition** of Adobe Type Manager from MacWarehouse. You'll greatly improve the output of your ImageWriter or Hewlett-Packard DeskWriter and make your Macintosh display text smoother and more legible than before. But don't stand in line to pay $99 at your local software store. Pick up the phone now, and for just $59 (plus $3 s&h), we'll rush your copy by overnight delivery!



Believe it or not, Adobe Type Manager solves the problem of jagged edges on screen fonts, too. Now, what you see on your screen will more closely resemble what you get from any PostScript printer — no more 24-point headlines that look like brick piles on screen. It's almost like having Display PostScript on your Mac— for only $59.

Adobe Type Manager is compatible with virtually every major application, and it's easy to install on any Mac (running System 6 or later) from a Plus to a IIci. Just a few clicks with your mouse — install it and forget it. Because you'll only need one size of a screen font installed in your System, you can also save megabytes of space on your hard disk. You won't need any additional memory, either.

If you have a non-PostScript laser printer, like Apple's LaserWriter IISC, Adobe Type Manager will give you PostScript - quality type, without the PostScript expense. And Type Manager includes high quality outline versions of 13 popular fonts, so it's easy to produce the kind of text you thought only came from a PostScript laser printer.



Our friendly MacWarehouse staff of Mac fanatics is standing by to help with any questions you may have. Remember, nobody beats our fast, dependable, overnight service for Adobe Type Manager or any of the other fine Adobe products.

NEW!

- **Adobe Plus Pack** — Contains 22 additional typefaces — Adobe Typeface Packages 1-5 and Helvetica Narrow. (These are not included with Adobe Type Manager.) The MacWAREHOUSE low price is just **$109!**
- **Adobe Type Set 1** — Contains 7 typefaces. The MacWAREHOUSE low price is just **$59!**
- **Adobe Type Set 2** — Contains 7 typefaces. The MacWAREHOUSE low price is just **$59!**

ADOBE TYPE SET 1	ADOBE TYPE SET 2
Hobo	Peignot Demi
Bodoni	*Present Script*
Poster	**Cooper Black**
Freestyle Script	**Franklin Gothic**
VAG Rounded	**No. 2 Roman**
Bold	COPPERPLATE
Linotext	GOTHIC 31AB
COTTONWOOD	LITHOS BOLD
TRAJAN	JUNIPER

*Designed for use with Adobe Type Manager — sold separately.

MacWAREHOUSE™

1-800-255-6227

24 hours a day, 7 days a week.
Inquiries: 1-201-367-0440
Fax: 1-201-905-9279

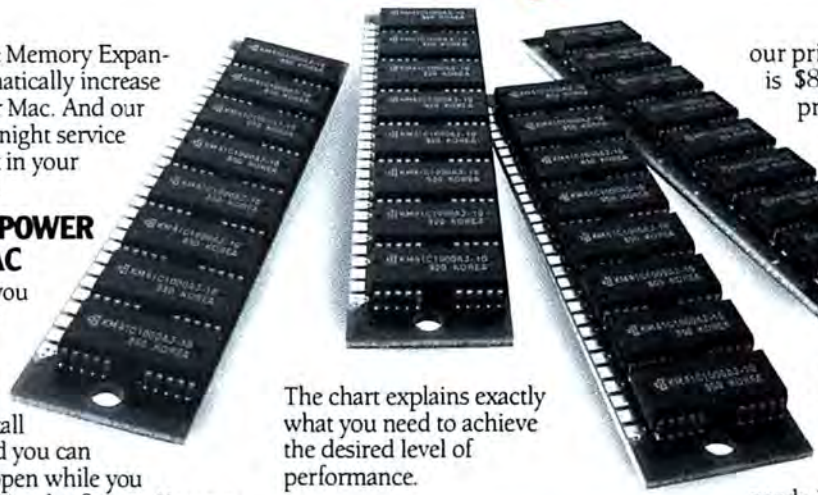
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MUDØS

Tomorrow's Upgrade For Your Mac Is Only $89*

MacWAREHOUSE SALE

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!



MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.



WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@$89each).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, or SE30 to this amount of memory	**Do this: (install in multiples of four only)**
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $15.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

*Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120 ns Samsung kits is $89. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Place your order by 12:00 a.m.(E), weekdays and we'll deliver overnight for just $3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

MacWAREHOUSE™

1-800-255-6227

Call toll-free
Twenty-four hours a day,
seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279

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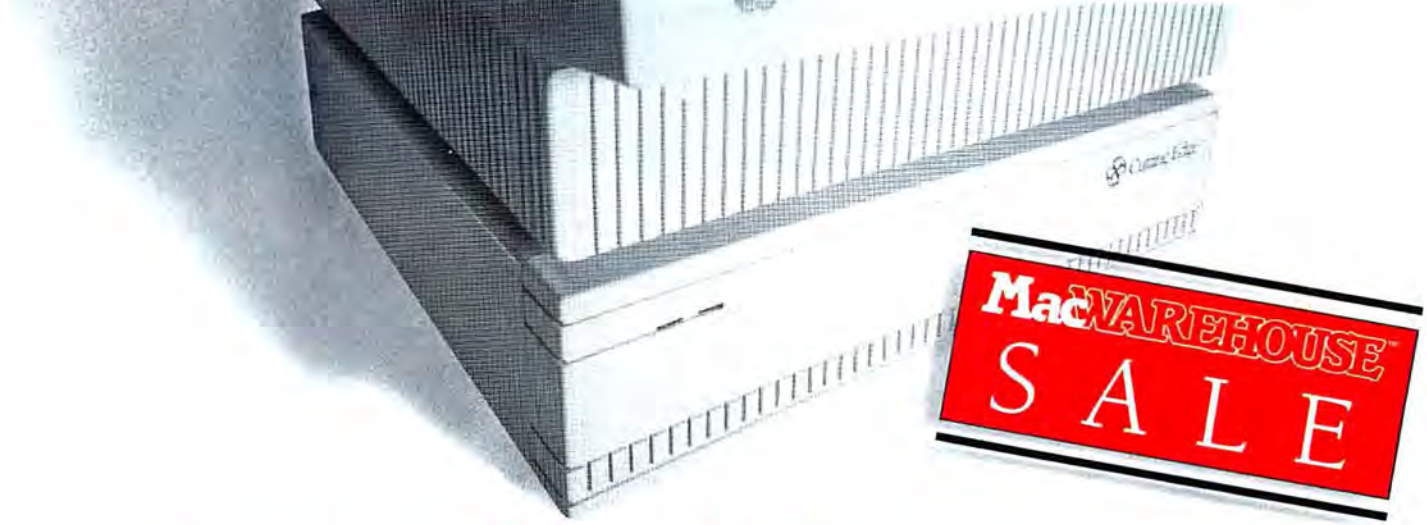
MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.



MUDØP



Buy a Hard Drive Now And Save Up To $300

"The best deal in hard drives just got better!"

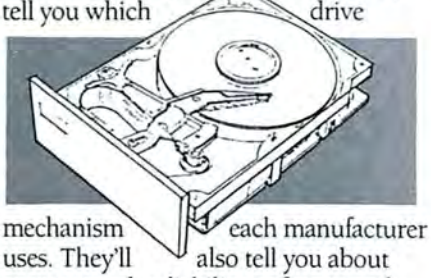
Between now and March 31st, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Dolphin, PLI Infinity Turbo and others — all at unheard of low prices.

	20+ MB		30+ MB		40+ MB		60+ MB		80+ MB		***40+ Removable	
	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE
Cutting Edge	359	$80	439	$60	499	$50	599	$30	659	$80	819	$80
CMS, MacStack	459	$70	499	$46	599	$26	649	$50	769	$30	839	$36
Dolphin, Integra	429	$70	479	$116	549	$170	615	$163	695	$300	879	$260
PLI, Infinity Turbo	–	–	569	$20	619	**$26	–	–	–	–	1098	$21
*Quantum Internal	–	–	–	–	499	$26	–	–	829	$40	–	–

Savings are calculated from MacWarehouse December 1989 published prices. *Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for $39. **PLI is a 50meg turbo drive. ***40+ meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive



mechanism each manufacturer uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied, just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid through March 31, 1990.) Overnight delivery is just $3, anywhere in the Continental United States.

So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

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1-800-255-6227

Call toll-free
Twenty-four hours a day,
seven days a week.
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MacWarehouse 30-Day Money Back Guarantee

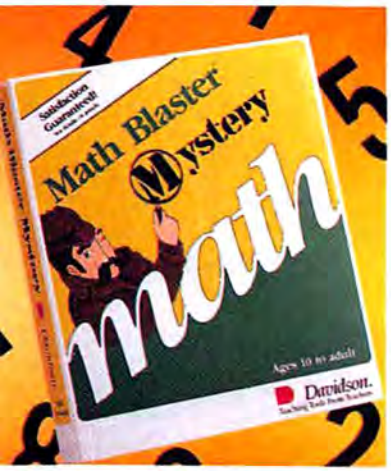
Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.

MUDØD



GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.



Math Blaster Mystery (Davidson & Associates, Inc.)
Surprise! While you weren't looking somebody put the fun back into math equations, word problems and logical thinking. Who dunnit? Davidson & Associates did...with Math Blaster Mystery! For ages 10 to adult, Math Blaster Mystery offers four challenging activities covering positive/negative numbers, fractions, decimals, percents, interest and pre-algebra. Exciting Animation and sound motivate you to search for clues while climbing the detective ladder from Compution Cadet to Chief Problem Solver! (educational/personal) **$26.**

ACCESSORIES

Apple
Toner Cartridges LaserWriter 111.
Avery Labels (full line available)
Color Coded 3.5 Diskette 4.
Laser 3.5 Diskettes 29.
Laser File Folders 6.
Laser Transparencies 22.
Basic Needs, Inc.
HardTop Keyboard Covers 15.
HardTop ImageWriter Covers 17.
Keyboard Flip 6.
Dust Covers - Grey Nylon Ripstop
ImageWriter or LaserWriter 12.
Mac Plus and keyboard 11.
Mac SE & extd. or reg. keyboard 11.
Mac II and extd. keyboard 12.
Universal Laser Printer Stand 28.
Utility Pac 11.
Computer Friends, Inc.
MacInker (IW & IW II) 41.
Curtis
Computer Tool Kit (52 pc.) 49.
Curtis Clip 6.
Disk Holder (holds 40) 9.
Jewel Surge Suppressors Call.
Ergotron
MacTilt-SE 68.
MacTilt II-RGB 75.
Goldstein & Blair
The Macintosh Bible 20.
I/O Designs
Imageware II Carrying Case 49.
Macinware IIcx Carrying Case 85.
Macinware Mac II Carrying Case 99.
Macinware Plus Carrying Case 64.
Macinware SE Carrying Case 75.
Monitorware Apple RGB Case 79.
The Ultimate SE Carrying Case 79.
Kalmar
Rolltop Teak disk holder 45 14.
Rolltop Teak disk holder 90 21.
Kensington
Anti-Glare Filter 33.
Apple Security Kit 34.
Mac II Stand w/Cable Kit 64.
MasterPiece Mac II 105.
PowerBacker 360 UPS Line 269.
PowerBacker 800 UPS Line 749.
PowerBacker 1200 UPS Line 949.
System Saver 63.
Mobius Products
Fanny Mac QT 59.
SE Silencer 39.
Polaroid
Circular Polarizing Filter 35.
Read-Write
CompuDuster 29.
Kleen & Dry CRT Pads 5.
Computer Care Kit 45.
Smack-a-Mac
Smack-a-Mac 9.
SoundSight
FastKeys 2.0 35.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) 69.
ImageWriter II Case (black) 45.
Mac Plus/SE Case (black) 55.
IIcx /IIci Case Call.



Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)
Pamper your Mac with a Targus carrying case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. Full Targus Macintosh line available in black. Some styles available in blue, burgundy, and platinum. (accessories) **$69.**



White Knight 11.0 (FreeSoft)
White Knight is Scott Watson's successor to the legendary Red Ryder telecommunications program. It's more than just a new version - the added new features list alone is more than 20 pages long! The 270+ pg. manual has plenty of step by step tips to help beginners communicate like the pros in no time. White Knight comes bundled with Okyto, a revolutionary Mac-to-Mac file transfer program. A free subscription to the GEnie network is also provided. (communications) **$89.**

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Aatrix
Checkwriter 37.
Payroll 3.5 109.
Payroll PLUS 149.
TimeMinder 175.
Bedford (Computer Associates)
Simply Accounting 225.
DAC
Dac-Easy Light 42.
Intuit
Quicken 1.5 36.
Layered, Inc.
at Once! 285.
MECA
Managing Your Money 124.
Monogram
Business Sense 269.
Dollars and Sense 81.
Nolo Press
For The Record 29.
WillMaker 32.

Casino Master (Centron)
Let it Ride! You can bet on having hours of fun with Casino Master's five exciting casino games. Includes **Blackjack Ace**, **Crapsmaster**, **Roulette Master**, **Pokermaster** and **Baccarat Master**. Exact table simulation, mouse controlled betting, selectable bankroll, stored win/lose statistics and complete manual included. Mac II version available in full color! An odds-on favorite with professional gamblers. (entertainment) Individual games **$27.**each/ 5 game Casino Master Package **$49.** / Deluxe Mac II version **$55.**



DeskPaint & Desk Draw (Zedcor)
One of the most powerful Paint DAs for the Mac is now bundled with the most powerful Draw DA. PICT, TIFF and MacPaint compatible. Works great with scanners! Features include autotrace, free rotation of graphics and text and on-line help. (graphics) **$64.**

ZBasic 5.0
Create true double clickable applications using the Mac's most powerful Basic Compiler, ZBasic. Includes the program Generator, a draw-like editor that takes the grunt work out of writing REAL Macintosh applications. Features include MS basic conversion utilities and 100's of example programs. (language) **$89.**

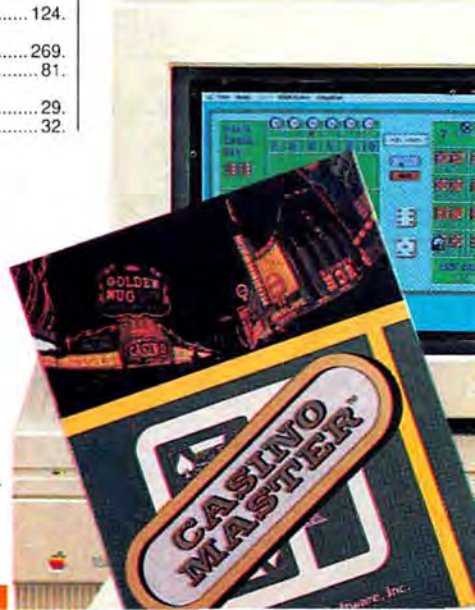
ShopKeeper Software
Bill-It 2.0 99.
Softview
MacInTax Federal '89 - 1040 65.
State supplements ea. 56.
MacInTax/Quicken 1.5 bundle 95.
Taxview 1040 355.
Survivor
MacMoney 3.5 60.

BLANK MEDIA

B.A.S.F. made in U.S.A
DS/DD (box of 10) 14.
DS/High Density (1.44 Meg) 24.
Peripheral Land, Inc.
Turbo 40 Cartridge 115.
Sony
DS/DD (box of 10) 14.
DS/HD (1.44 mb) 25.

BUSINESS & PRESENTATION

A Lasting Impression
ResumExpert (word vers.) 39.
Cover Letters or Students 39.
Manager Edition 39.
Sales and Marketing Edition 39.
Adobe Systems, Inc.
TrueForm SetUp 225.
AEC Management Systems
FastTrack Schedule 115.



SCRAMBLE!



Nightmare! It's midnight and your hard disk crashes. Or you read about a new piece of software you just can't do without.

Remember, the sun never sets on the folks at MacWarehouse. Ring...ring (only three rings?)... "How may I help you?"...."No problem Sir, we'll take care of it...We'll get it to you overnight — and the charge is just $3."

While you drift off to sleep the computers whirr. At our satellite warehouse — a former SAC airforce base — ROBOMAC prepares your order for immediate dispatch. The flight crews are standing by. One last hand of Old Maid. Don't want to miss that last order at 12:01! Then,... SCRAMBLE! They'll fly through the night to deliver your order (and thousands of others) not long after the morning paper. That's right. Order until 12:00 am for overnight delivery. It's called MIDNIGHT EXPRESS SERVICE and nobody else has it. Nobody gets it to you faster than MacWarehouse ... Nobody!



Win the *NEW* Mac Portable!

It's here at last! It has all the power and convenience of your Mac in a 15.7 pound portable package.

And you can win the new Macintosh Portable by entering the MacWAREHOUSE PORTABLE COMPUTER GIVEAWAY. Your name is automatically entered into the drawing when you order from MacWAREHOUSE, or when you fill out and send in the Official Entry Coupon below.



MacInTax Federal '89-1040 (Softview)
MacInTax Federal '89-1040 guides you through the process of preparing your Federal Taxes (eight state tax modules also available at $56 ea.). Just type in the requested numbers, and MacInTax does the rest. When finished, print the completed return on the LaserWriter or the ImageWriter. If you used MacInTax last year, it reads those files and brings forward relevant items, saving time and reducing errors. Its tax planner shows the effects of various tax strategies. (finance) **$65.**



Dreams (Innovative Data Design)
IDD, creator of MacDraft, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general purpose graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut edges of objects using other objects as templates...even glue lines and curves together to form unique shapes to be filled with colors or patterns. (graphics) **$325.**

SuperPaint 2.0 (Silicon Beach)
SuperPaint gives you the freedom of paint and the precision of draw in one easy-to-use program! Features powerful AutoTrace to automatically convert bitmapped paint graphics into high resolution draw objects, an adjustable airbrush, and a freehand tool to quickly sketch editable Bezier curves. You can mix fonts, styles and sizes within text blocks, and freely rotate, scale, or slant text and graphics without sacrificing high-resolution output. Oversized documents automatically "tile" over multiple pages, in either "Portrait" or "Landscape" orientation. (graphics) **$125.**



I'm Kerry, call me at:

MacWAREHOUSE™

1-800-255-6227

(1-800-ALL-MACS)

Inquiries:
FAX: 201-905-9279

Call anytime — day or night 24 hours a day, seven days a week

*Midnight Express service available weekdays.



OFFICIAL ENTRY COUPON MUDØ

MacWarehouse Portable Computer Giveaway
1690 Oak Street, P.O. Box 1579, Lakewood, NJ 08701

When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787. (In CT., call 1-203-852-8968)

Name _____

Address _____ Apt. _____

City _____ State _____ Zip _____

FROM MacWAREHOUSE™



FastLabel
End label hassles with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatted templates to instantly create labels. One step text loading from any commercial database. Save hours of your valuable time! (business) **$49.**



Managing Your Money
A fully integrated software program addressing every aspect of personal and small business finance. Write and print checks, set up a personal budget, estimate your taxes and more. (finance) **$124.**



Ferrari Grand Prix
Gentlemen Start Your Engines! Squeeze into the cockpit of this thrilling Formula One racing simulator. Test your skill, concentration and nerve while chasing two cagey opponents around world famous Grand Prix courses. Handicap opponents and personalize racecourses for exciting competition. Spectacular sound and graphics. (entertainment) **$32.**



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Odesta
Double Helix III 339.
GeoQuery 199.
ProVUE
Panorama 257.

DESK ACCESSORIES

Casady & Greene
QuickDEX 31.
JAM Software
Smart Alarms & Appt. Diary 49.
Smart Alarms (1 - 4 users) 99.
Smart Alarms (5 - 8 users) 149.
Smart Alarms (9 - 16 users) 199.
Preferred Publishers
DAtabase 1.5 69.
Vantage 1.5 52.
Solutions
SmartScrap & The Clipper 2.0 45.

DESKTOP PUBLISHING

Aapps
MicroTV 289.
Aldus
PageMaker 3.02 385.
PageMaker Color Extension 135.
Broderbund
DTP Advisor 47.
Data Translation
PhotoMac 609.
Emerald City Software
Smart Art I, II, or III ea. 85.
Icom Simulations
MacKern 119.
Letraset
ColorStudio or FontStudio Call.
ImageStudio 275.
Ready,Set,Go! 275.

CanOpener 1.1 (Abbott Systems)
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Under the Mac 60+ Meg 599.
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Dayna Communications
Dayna File Single 360K (5 1/4") 525.
Dayna File Dual 360K & 1.44M 729.
Dolphin Systems Tech
Integra 20 Meg 429.
Integra 30 Meg 479.
Integra 40 Meg 549.
Integra 60 Meg 615.
Integra 80 Meg 695.
Flipper 44 Meg 879.
Fujitsu
800K Disk Drive 159.
Kennect Technology
Drive 2.4 329.
Rapport 199.

EDUCATIONAL/ PERSONAL

Beacon Technology
GEMS of the Word 25.
BrightStar
Alphabet Blocks 30.
Talking Tiles 27.
Bootware Software
ResumeWriter Pro 58.
Davidson
Math Blaster Mystery 26.
Speed Reader II 26.
First Byte
The Dinosaur Discovery Kit 27.
The Puzzle Storybook 27.
The Rhyming Notebook 27.
Help Software, Inc.
Desktop Help for Excel 50.
Learning Company
Math Rabbit 31.
Reader Rabbit 31.
MicroTech
Elementary Signer 49.
Finger Speller 29.
Nordic Software (full line available)
MacKids Turbo Math Facts 28.
MacKids Preschool Pack 35.
MacKids Word Quest 30.
Penton Overseas
VocabuLearn French, Spanish, German, Italian ea. 30.
VocabuLearn Japanese 36.
The Software Toolworks
Mavis Beacon Teaches Typing 32.
Visionary Software
Synchronicity 39.
Voice & Video Instruction Videos
HyperCard or Pagemaker 3.0 ea. 35.
Word 4.0 Video Tape 35.

VocabuLearn (Penton Overseas, Inc.)
A computer enhanced foreign language learning system for the Mac. A versatile, interactive HyperCard Stack, available in five languages and two levels. Each comes with two 90 minute audio cassettes, a handy size word list with over 1500 useful words and expressions, and HyperCard V.1.2. This is a great bilingual aid. Ideal learning tool for students, travelers, business people, and educators alike. Increase your comprehension using the building blocks of language! (education) French, Spanish, German, Italian **$30. ea.** Japanese **$36.**



Olduvai
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Read-It! Personal 2.0 125.
Read-It! TS (ThunderScan) 79.
Quark
QuarkStyle 169.
Xpress 449.
Spinnaker/Springboard
Plus 1.1 115.
Springboard Publisher II 109.
TimeWorks
Publish-It! 225.

DISK DRIVES/BOARDS

Aristotle Industries, Inc.
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HardPac Mac 40 Meg 749.
HardPac Mac 80 Meg 1089.
HardPac Mac 105 Meg 1229.
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MacStack 20 Meg 459.
MacStack 30 Meg 499.
MacStack 45 Meg 599.
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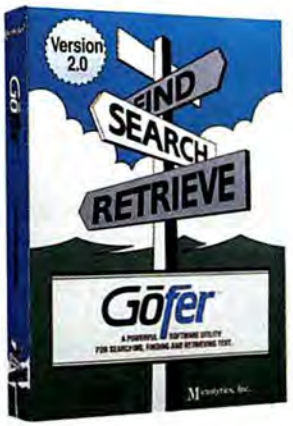
Peripheral Land, Inc.
Infinity Turbo 40 Meg 1098.
Turbo Floppy 1.4 359.
Quantum
Quantum 40 MB Raw Drive 499.
Quantum 80 MB Raw Drive 829.
RasterOps
RasterOps Colorboard 264 760.

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Cognition Technology
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The Microsoft Office 599.
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Power Up
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Address Book Plus w/Binder 99.
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Letter Writer Plus 53.



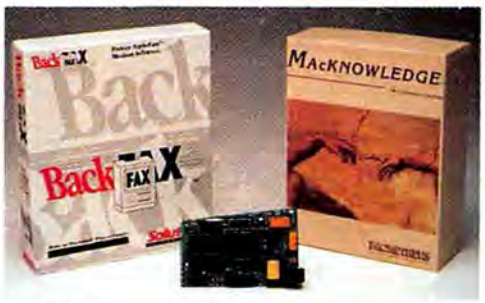
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Vertical Solutions
FastLabel 49.

CAD/CAE

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CompuServe Subscription Kit 24.
Connect Inc.
MacNet 47.
DataVIZ
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MacLink Plus/Translators 4.1 109.
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Dow Jones
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Farallon
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TrafficWatch 125.
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Hayes
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Infosphere
Liaison 175.
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Soft PC (Mac II) 245.
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MAcKNOWLEDGE 149.
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Software Ventures
Microphone II v.3.0 219.
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FlashBox 122.
FlashCard 155.
Repeater 122.
Teleconnectors 29.
TOPS 2.1A 159.
TOPS 3.0 Network Bundle 189.
TOPS DOS Network Bundle 165.
Traveling Software
Lap Link 81.
Lap-Link III Connectivity Pac 114.
Lap-Link III Network Pac 189.

DATABASE SOFTWARE

Acius
4th Dimension 2.0 469.
AEC Management Systems
AEC Information Manager 409.
Blyth
Omnis 5 375.
Claris
FileMaker II 219.
Fox Software
FoxBASE+/Mac 295.
Microsoft
File 2.0 125.

Liaison
Liaison is the Eddy award winning software for connecting AppleTalk networks locally or remotely. Dial into AppleShare, MacServe or TOPS and access your E-mail anywhere, anytime. Offers exceptional flexibility, performance and network security. (networking) **$175.**



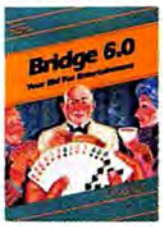
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HandOff lets you open any document from the finder, even if its application is missing. You can specify a compatible substitute based on the document's creator or file-name extension, even across networks. Jean-Louis Gassee calls it "a nice, unobtrusive and very much needed extension to my Macintosh". (utility) **$32.**



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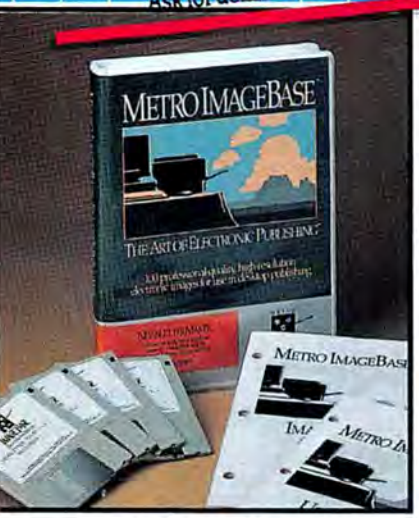
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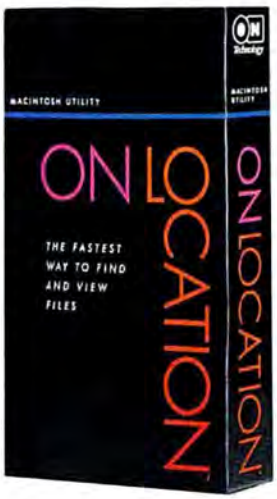
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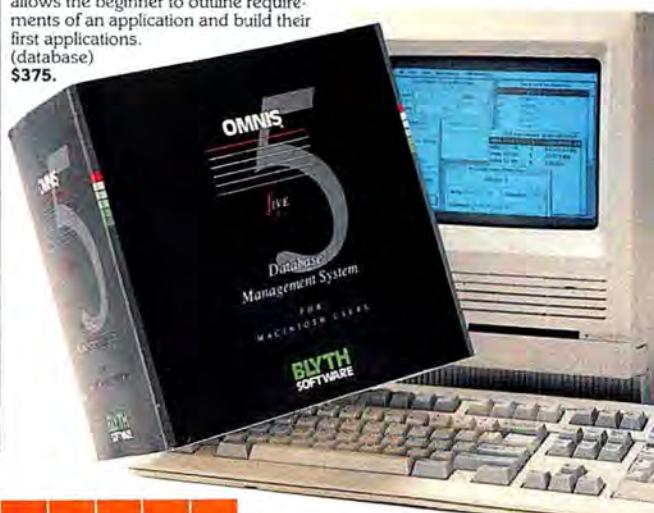
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Kraft Premium III Joystick
The button placement ensures fast action and comfortable use. Precision gimbals and dual-axis fine-tuners, give complete control over its operation. Connects to the ADB port of the Mac SE or Mac II (input/output) **$49.**



Mac 101 Keyboards (DataDesk International)
Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. (input/output) **$139.** International Versions also available.



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Endeavour Planner
Endeavour Planner puts you in charge of complicated projects. Its easy to use GANTT chart display lets you point, click and drag on any item. Each project can have its own calendar. You can adjust schedules midstream when conditions change, or lock in fixed deadlines. (business) **$95.**

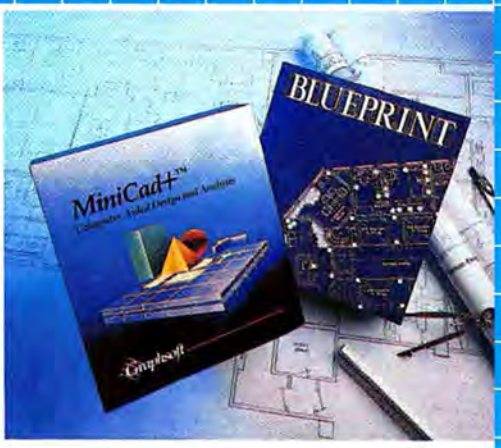


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ThunderWare
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ThunderScan 5.0 187.

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HyperAtlas 59.
Power Up
HyperTutor 29.
Silicon Beach
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Softstream International
HyperHit 125.
Springboard
Family Matters 28.
Symmetry
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TimeWorks
HyperWorks Organizer 57.

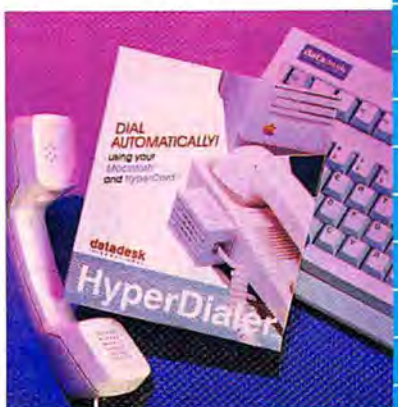
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Cutting Edge
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DataDesk Intl.
Mac 101 Keyboards 139.
International versions Call.
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Koala
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Kraft
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QuickStick 39.
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A+ Mouse (SE/II) 79.
A+ Mouse (512/Plus) 59.
Practical Solutions
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Mouse Master 57.
Summagraphics
Bit Pad Plus 319.

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Now you can connect your Macintosh to your existing business or home telephone for automatic dialing with Apple's HyperCard. DataDesk's HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with-line business phones without requiring a modem or dedicated phone line for automatic dialing. Automatically dials HyperCard, SideKick, Focal Point, C.A.T., SuperCard and QuickDex phone numbers. It connects to Mac's speaker port - not a precious serial port. (hyperware) **$29.**





GUARANTEE

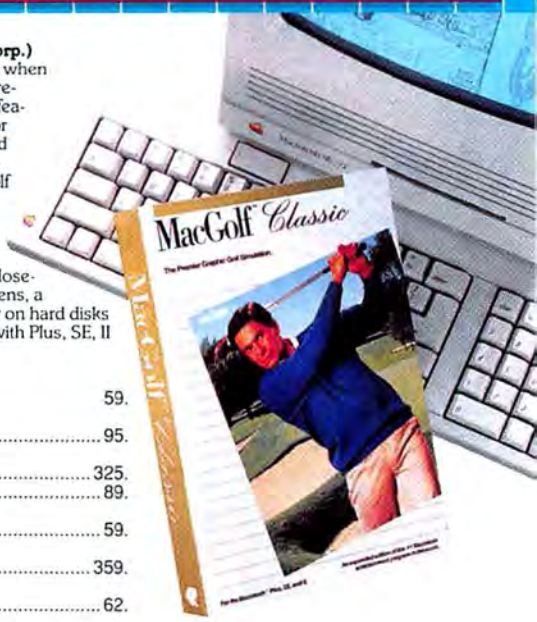
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UltraPaint (Deneba Software)
Michelangelo would turn Veronese green with envy! Combines B&W/color painting, gray scale image processing and object-oriented drawing. Supports 256 colors, a multi-color airbrush, editable mask & lasso, a water droplet tool and more. It's Open Architecture design makes adding features easy. (graphics) **$125.**

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Harmony Grid 59.
Intelligent Music
OvalTune 95.
Passport Designs
NoteWriter 325.
Passport MIDI Interface 89.
Primera Software
Different Drummer 59.
Repertoire
Music Publisher 359.
Resonate
Listen 2.0 62.
Tactic Software
Sound Clips Vol. 1 or 2 ea. 49.

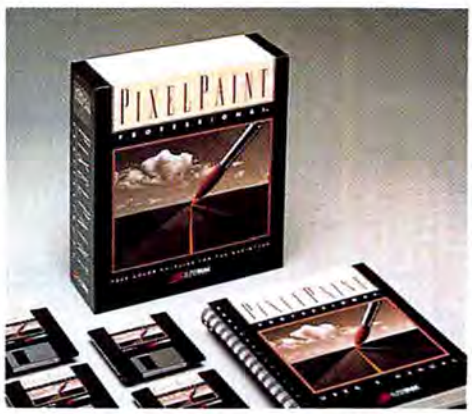
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InterFax 24/96 425.
Best Data Products
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Hayes
Smartmodem 1200 295.
Smartmodem 2400 429.
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Prometheus
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Bogas Productions
Super Studio Session 2.0 65.
Coda
Finale 589.
MacDrums 31.
Perceive 49.
Electronic Arts
Deluxe Music Construction 2.5 85.
Deluxe Recorder 99.
Esthetic Engineering
Music Mouse 49.
Farallon Computing
MacRecorder (records sound) 164.
Screen Recorder 125.
First Byte
SmoothTalker 33.
Great Wave
Concertware+MIDI 5.0 99.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
FileGuard 125.
FileGuard Extend (office 5-pak) 309.
TWINS 109.
Fifth Generation
Disk Lock 107
Kent Marsh
MacSafe II 107.
NightWatch 86.
QuickLock 56.
Mainstay
AntiToxin 59.
Microcom
Virex 2.2 52.
Symantec Corporation
S. A. M. 69.

SPELLING/DICTIONARY THESAURUS CHECKERS

Deneba Software
BigThesaurus 59.
Spelling Coach Pro 3.1 125.
Electronic Arts
Thunder II 49.
Lexpertise
MacProof 3.2.1 115.
Microlytics
Electronic Word Finder 69.
Word Finder 2.0 34.
Sensible Software
BookEnds 53.
Sensible Grammar 51.

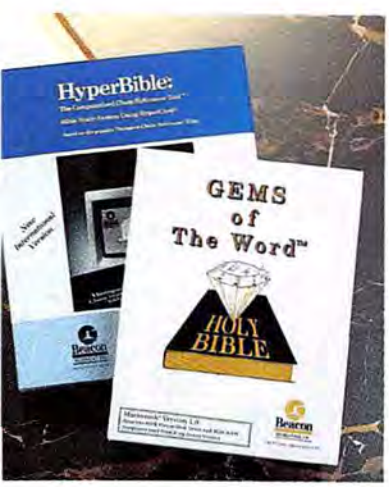
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BrainPower
StatView 512+ (requires 512k) 149.
D2 Software
MacSpin 2.0 189.
Odesta
Data Desk 3.0 349.
Paracomp
Milo 159.
Select Micro Systems, Inc.
Exstatix 219.
Wolfram Research
Mathematica (SE) 450.

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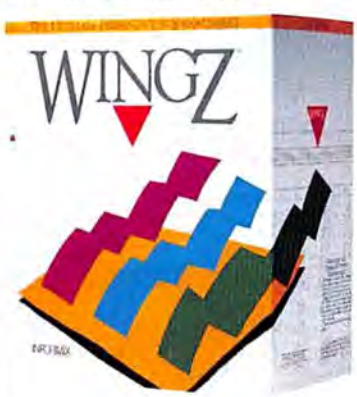
Abbott Systems
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Affinity
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Aladdin Systems Inc.
Programmer's Assistants 75.
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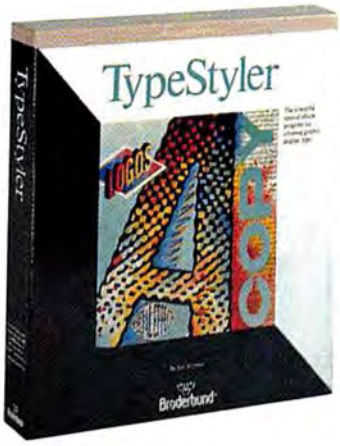
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CE Software
DiskTop 4.0 64.
QuicKeys 1.2 64.
Caere
OmniPage 549.
Central Point Software
Copy II Mac 24.
Mac Tools 45.
Custom Applications
Freedom of Press 2.1a 265.
Dantz Development
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Dayna Communications
DOS Mounter 55.
Emerald City Software
Lasertalk 1.0 149.
Fifth Generation
FastBack II 107.
PowerStation 2.5 34.
Pyro 14.
Suitcase II 44.
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MacTree Plus 46.
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On Cue 35.
Insight Development
MacPrint 95.
Magic Software
AutoSave II 29.
BackMatic 50.
POWERicons or POWERmenus ea. . 39.
Mainstay
Capture 2.0 49.

Microlytics
GOfer 45.
Olduvai
ClipShare 139.
MultiClip 50.
ON Technology
On Location 75.
PCPC
HFS Backup 3.0 54.
Peripheral Land, Inc.
TurboBack 55.
TurboCache or Turbo Spool ea. 69.
TurboOptimizer 39.
Preferred Publishers
Exposure 52.
Software Innovations
HandOff 32.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 58.
Sentinel 2.2 87.
SuperLaserSpool 2.0 (single user) 87.
Super LaserSpool (5-pack) 289.
Symantec Corporation
SUM II 99.
Tactic Software
FontShare 2.0 149.
Icon-It 2.0 39.
Williams & Macias
DiskFinder 27.
myDiskLabeler 33.
StickyBusiness 1.07 89.
XTree Company
XTree Mac 52.

WORD PROCESSORS & OUTLINERS

Ashton-Tate
FullWrite Professional 259.
Claris
MacWrite II 169.
DeltaPoint, Inc.
MindWrite 2.1 95.



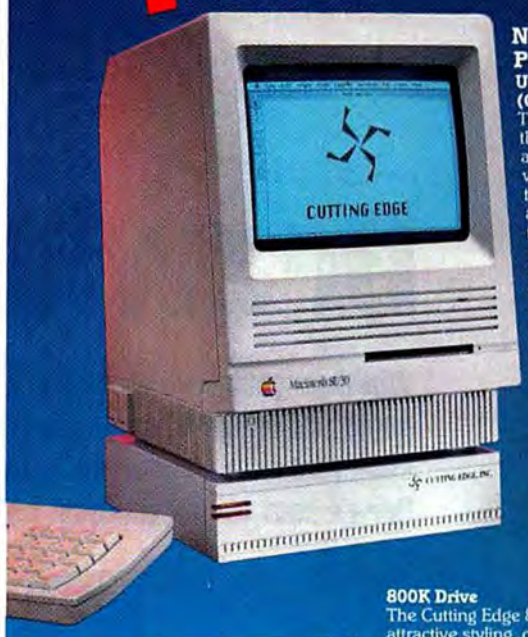
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Drawing the Line

Whether you're in business, art, or education, an object-oriented drawing program is an essential part of your software tool kit. Here's how to find the best software for you.

By Salvatore Parascandolo

Drawing programs are amazingly flexible. They're ideal for light-duty drafting and space planning or pinch-hitting for page-layout software. They let you produce charts, maps, diagrams, and form templates; print large signs; create aesthetic and technical illustrations, art-intensive layouts, fliers, book covers, and murals; and do color prepress work.

In the object-oriented world of drawing programs, everything you draw is an independent item that can be altered without affecting other elements. When you enlarge an object, it stays smooth. But illustrations made with painting programs are mosaics of dots that are hard to edit. Paintings become jagged when enlarged, crumble when rotated, and show gaping holes when you shift a section from one place to another.

Fortunately, this is a golden age for drawing programs. Apple's MacDraw was a model of efficiency and utility. Then came SuperPaint, which integrated painting and drawing. Adobe's Illustrator introduced the addictive Bezier curve. Aldus' FreeHand made Bezier work more palatable with (what else?) the freehand curve. It also added 200 layers, text wizardry, and multiformat importation. Deneba's Canvas upped the ante with unlimited named layers, 256-color drawing, and painting. Dreams added rich textures and valuable CAD features in a comfortable framework. Nearly every drawing application can now auto-trace a bit map, which greatly speeds up many kinds of projects. Both MacDraw and Canvas are now able to check spelling. Canvas' Michelangelic cousin,



Ultra-Paint, offers drawing, 256-color painting, photo retouching, and plug-in tool modules for its drawing and painting modes.

Share and Share a Line

All drawing programs have import and export options for transferring work saved in PICT format from one program to another. You can save a Dreams CAD file in PICT format, for example, and edit it with Canvas or SuperPaint. But your objects may lose their original pattern and color attributes, particularly if you use a feature that's unique to the exporting program.

Both FreeHand and Illustrator 88 can convert object-oriented PICT drawings to their own formats. You can even place (but not edit) FreeHand or Illustrator art with PostScript effects into non-PostScript programs by selecting an object, holding down the Option key while choosing Copy, and then pasting the copied item into the Scrapbook or another program.



PHOTOGRAPHY: FRED STRASSON ILLUSTRATION: JOEL DELP

Desperately Seeking Features

A drawing program can save you time and effort, provided its abilities are matched to the job and its interface is matched to the user. Look for features that save you time, money, and mistakes.

Navigating and zooming through a drawing should be as natural as looking through papers on your desk. FreeHand and Illustrator provide excellent navigational freedom. If your drawings are usually multipage, you should be able to name key views that you can go to instantly at a given magnification. Canvas, Dreams, and MacDraw do this elegantly.

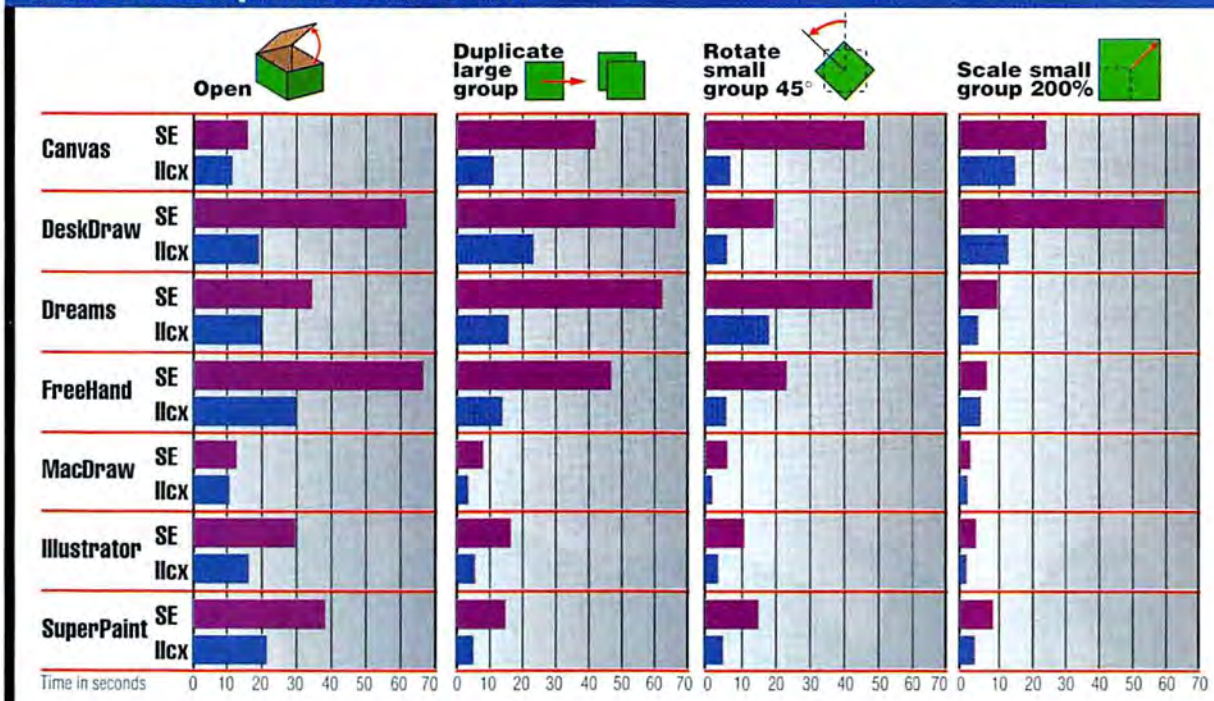
Using *multiple layers* is a powerful method of managing objects. It lets you draw complex art such as architectural renderings or floor plans easily. Layers are like transparent floors in a building where the objects on all floors are visible. In a multilayer environment, all the objects in one layer can be edited and restacked without affecting objects in other layers. Objects in the active layer can be moved to another layer, and you can create, shuffle, hide, and delete layers. Most of the programs I reviewed offer 200 or more layers. Canvas, Dreams, MacDraw, and UltraPaint let you name layers. DeskDraw has a single layer, and SuperPaint has two — one for drawing and one for painting.

Blending is a key feature that can serve many purposes. Basically, you select two objects of different shape, color, orientation, and size and instruct the program to generate a specified number of intermediate shapes to create a seamless progression from one object to the other. Blending can create precisely controlled shading effects, a sequence of objects that shrink toward a vanishing point, and magical-looking transformations in which one item mutates into something entirely different. Both FreeHand and Illustrator blend all object attributes very well; Canvas, SuperPaint, and UltraPaint have more-limited shape-transformation capabilities.

Masking is one of the most powerful features of PostScript drawing programs. PostScript lets you use a drawn outline as a frame through which you see other objects. It's the supreme cropping tool, especially if you make irregular masks. You can get the same effect by covering up parts of a picture with opaque shapes, which is a clumsier method because the shapes can be inadvertently selected. FreeHand and Illustrator are the only programs that offer this masking feature.

Bezier curves: You either love them or hate them, but they're the key to achieving graceful contours and flawless transitions. With the right combination of these curves, you can draw any shape. Shape editing is simplified by the curves' handles. Bezier novices face a set of seesaw

Table 1: Who's Quickest to the Draw?



Seven drawing programs were tested on a Mac SE and IIcx to see how quickly they could perform some typical operations on many objects. The test file consisted of three groups, each containing 235 objects — lines, circles, rectangles, and polygons. Two groups were combined into a large 470-object set for duplication tests. The "small" 235-

handles that mysteriously control the path of a wiggly line that seems to have a mind of its own. First attempts are often exasperating, but hang in there — with every session, your instincts will awaken, and you'll be able to dash off most paths in seconds. The key is sticking with it.

Both FreeHand and Illustrator 88 are based on the Bezier curve, and each offers full-blown construction and editing. Canvas and UltraPaint also have excellent Bezier construction and editing savvy. In SuperPaint you create a path with the freehand tool and edit it as a Bezier curve. Dreams has the most limited Bezier ability — you can't form sharp angles or independently control each side of a curve. Instead of a Bezier curve, DeskDraw and MacDraw provide smooth polygons or splines that are usable but not nearly as flexible.

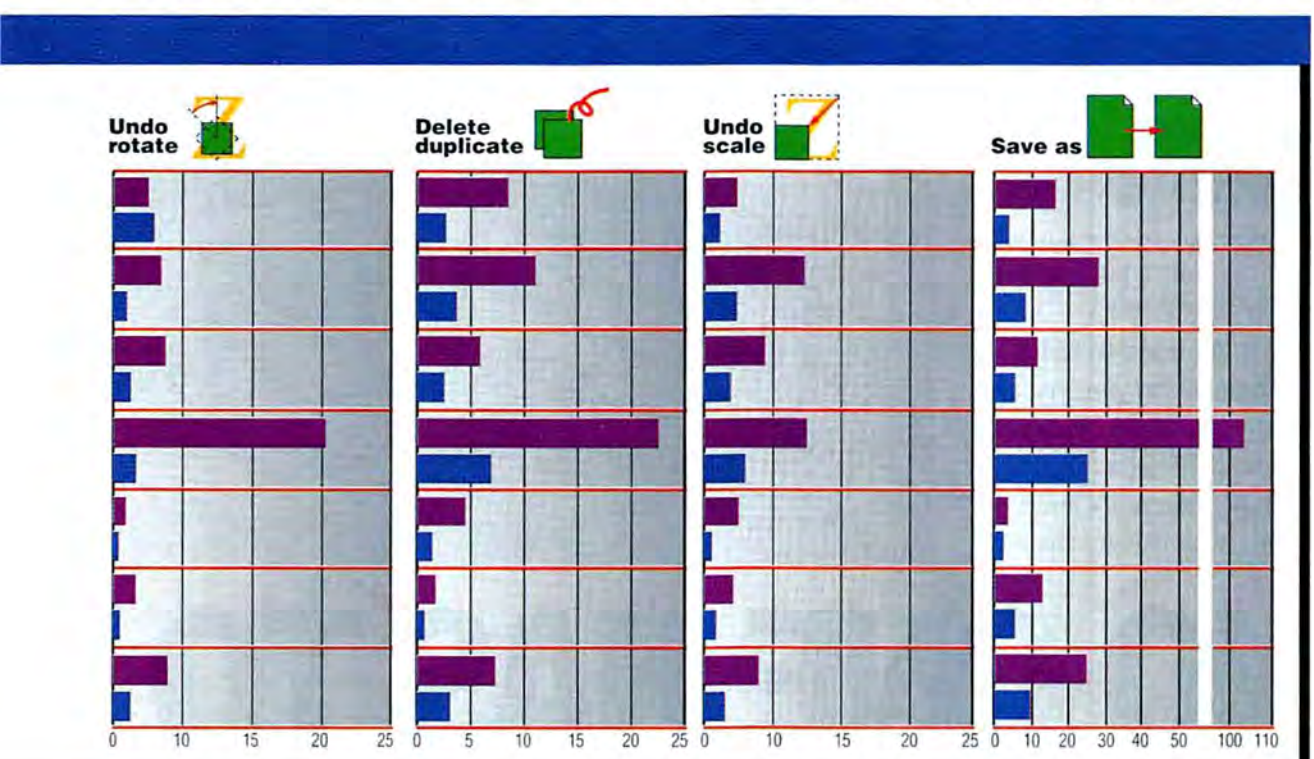
Shape editing is a key factor in the freedom drawing programs offer. Shape editing is a joy because of the ease with which you can add or remove points, make pointed parts smooth, make smooth parts pointed, remove chunks from a line, and combine several outlined shapes into a single one. FreeHand and Illustrator offer all that and more by letting you copy sections of a curve by selecting one or more points. You can use the copied segment as part of another object — a time saver if you want to perfectly mate two adjoining shapes.

Angled axes literally add a new dimension to your drawing environment. They let you tilt the drawing plane by a specified angle and provide a position grid along the plane. Every basic shape you draw, such as a rectangle or ellipse, automatically obeys the tilt, making it easy to render isometric views. FreeHand and Illustrator both give you this ability but no automatic help with vanishing points. The angled grids in Canvas and MacDraw are a weak substitute.

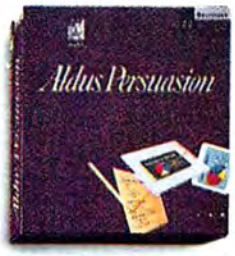
Hardware to Suit Your Needs

Before you choose your drawing program, consider carefully its intended uses and end products. You'll either have to buy a program that fits the hardware, or change the hardware to accommodate the program.

RAM will be a crucial factor in what you can accomplish with a program. The limitations of a 1-megabyte Macintosh reduce your selection of programs and the complexity of the artwork you can create. With Illustrator and a single megabyte of RAM, for example, you can draw only a few simple objects before the working memory gets full. Two megabytes can accommodate most business art and let you use Freedom of Press utility software from Custom Applications International (see StartUp, Jan. '90) for PostScript output, Adobe Type Manager, and Apple's future System 7. You can freely use INITs and DAs or have several heavy-duty applications open in



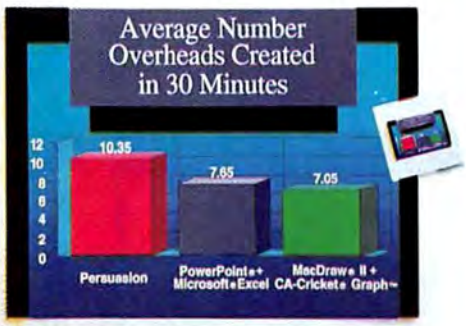
object group was used in rotation/scaling tests. The Save As time reflects the entire 705-object document. Tests were run on a Mac SE with 2.5 megabytes and a Mac IIcx with 5 megabytes, both with hard disk drives. Time is in seconds. Where programs didn't support numerical scaling and rotation, these were done by eye.



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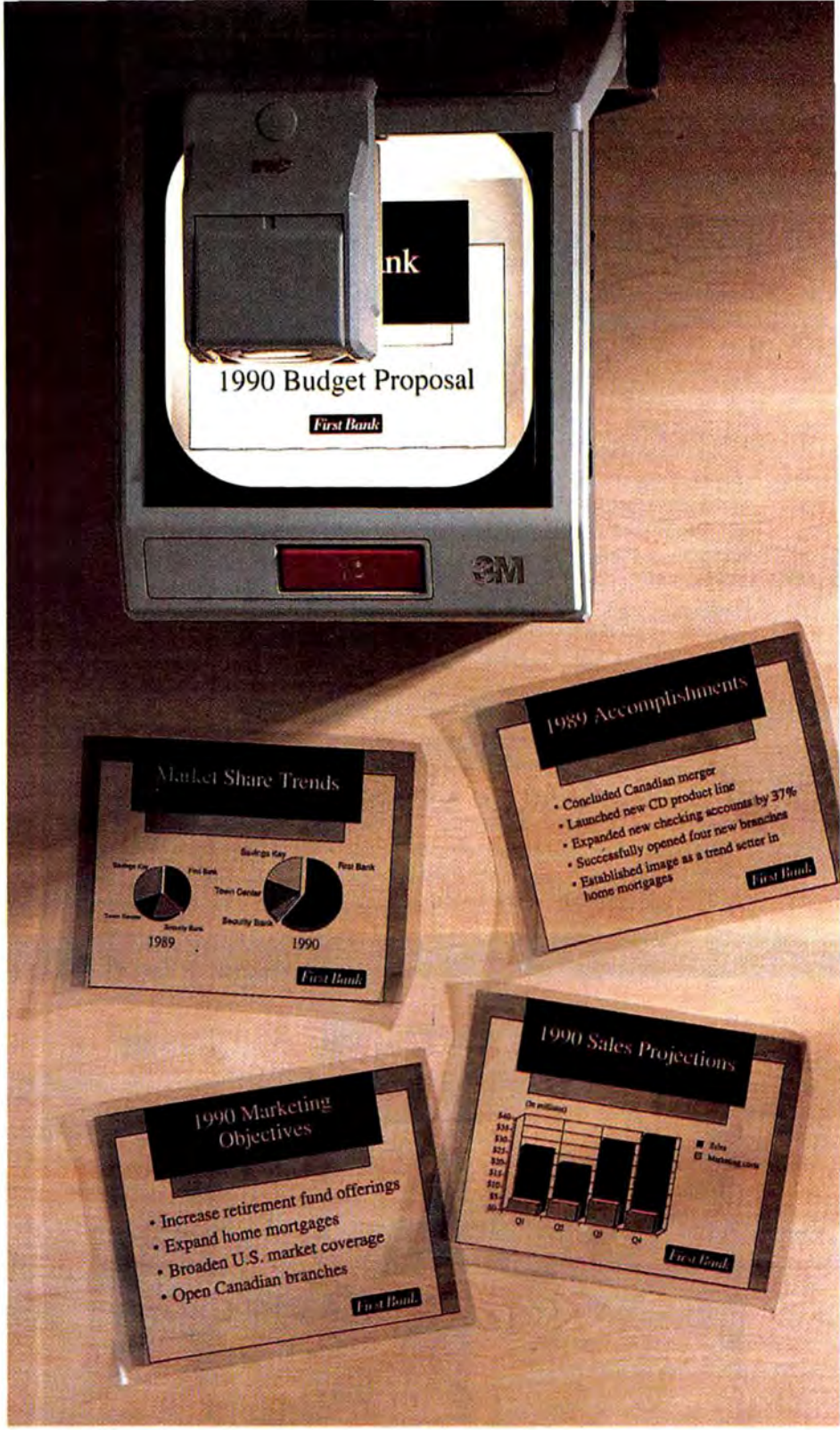
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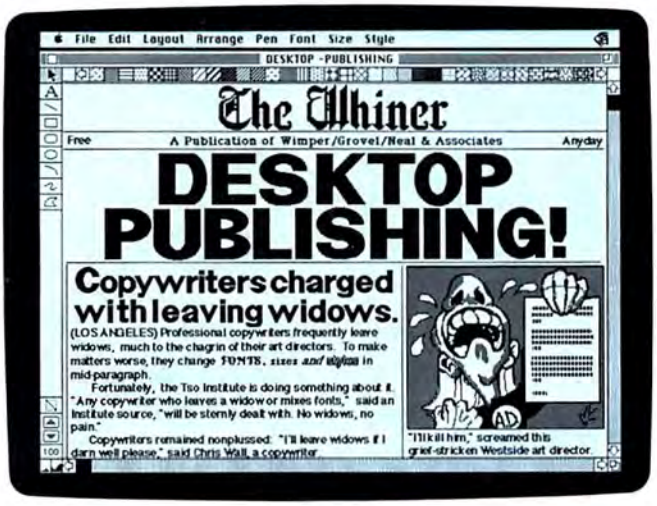
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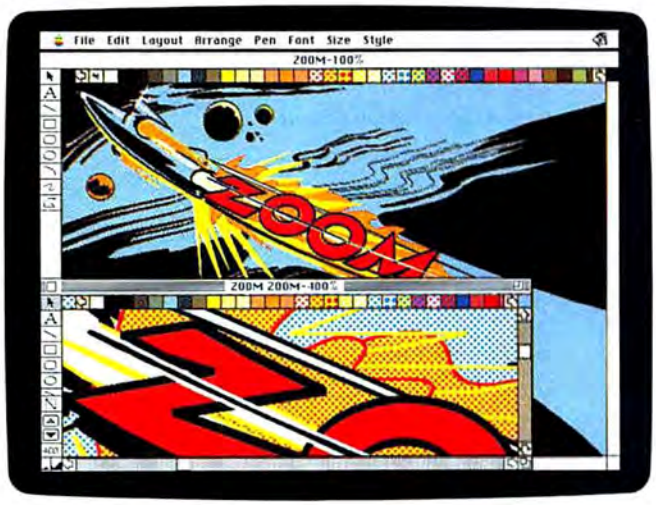
Table 2: Features of Drawing Programs

	Canvas 2.1	DeskDraw/Paint 1.3	Dreams 1.0
Minimum system	Mac Plus, 2 floppies	512K, 1 floppy	Mac Plus with hard drive
Price	$299.95	$129.95 (bundle)	$500
Maximum document dimensions	9' x 9'	24" x 24"	107" x 111"
Maximum open documents	RAM-limited	1	4 and symbol libraries
Colors available	16.7 million	8 add/sub primaries and b/w	16.7 million
Color-specification system	RGB, HLS	none	RGB
Color separations	with bundled utility	no	no
Zooming range	12% – 3,200%	6.25% – 1,600%	12.5% – 3,200%
Named views	yes	no	yes
Maximum layers	RAM-limited, named	1	RAM-limited, named
Hide layer	yes	NA	yes
Restack layers	yes	NA	yes
Special lines and curves			
Arrowheads	yes, editable	no	yes
Dashed lines	yes, editable	yes, using patterns	yes, editable
Dimension lines	yes	no	yes, associative
Curve construction	Bezier, freehand, spline	freehand, spline	smooth Bezier, freehand, spline
Range of line weights	hairline – 127 pt	hairline – 10 pt	hairline – 11 pt
Object editing			
Select by type	yes	no	yes, text only
Select multiple points	only for deletion	no	no
Add/remove points	yes	no	yes
Fills	2-color bit map and PS grays	1-color bit map	8 x 8-to-32 x 32 color bit map
Smooth	yes	yes	yes
Split/join	split anywhere/join	no	split at vertices/join
Distort	yes	no	no
Skew	yes	no	no
Scaling	numerical, proportional, manual	proportional, manual	numerical, proportional, manual
Scale or retain line weights	yes	no	retain only
Precision features			
Align objects	yes	yes	yes
Distribute objects	yes	no	yes, along line
Area calculation	yes	no	yes
Measurement units	in., pt, cm, pica	in.	in., ft, metric
Rulers	yes, customizable	ruler lines only	yes, customizable
Snap To option	independent x-y grids	grid	grid, point
Show dimensions	yes	no	yes
Text handling			
Maximum point size	127	127	127
Mixed fonts/styles per block	yes	no	yes
Full justification	no	no	no
Rotate to any degree	yes	yes	yes
Skewing	yes, but prints as bit map	no	no
Text on a curve	no	no	no
Bit-map handling			
Colorize	yes	yes	yes
Auto-trace	yes	yes with DeskPaint	no
Resolution range (dpi)	72 - 2,540	72 – 4,000 with DeskPaint	72
Import/export formats			
PICT	import/export	import/export	import/export
TIFF	import/export monochrome and color	import/export via DeskPaint	no
EPSF	EPSF, PICT EPSF, Clipboard EPSF	no	no
Other	exports Illustrator 1.1	NA	PictScript, MacDraft













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Table 2, continued

	FreeHand	Illustrator 88 1.9.3	MacDraw II 1.1
Minimum system	Mac Plus, two 800K floppies	Mac Plus, 2MB, 2 floppies	Mac Plus
Price	$495	$495	$399
Maximum document dimensions	40" x 40"	18" x 18"	100" x 100"
Maximum open documents	RAM-limited	RAM-limited	7 documents and 7 libraries
Colors available	16.7 million	16.7 million	8 primaries, ditherable
Color-specification system	CMYK, Pantone, RGB	CMYK, Pantone	NA
Color separations	yes	with bundled utility	yes
Zooming range	12.5% – 800%	6.25% – 1,600%	3.12% – 3,200%
Named views	no	multiple views of same art	yes
Maximum layers	200, numbered	1	RAM-limited, named
Hide layer	yes, also lock objects	no, hide or lock object	yes
Restack layers	no	none	yes
Special lines and curves			
Arrowheads	no	no	yes, editable
Dashed lines	yes, patterned	yes, editable	yes, editable
Dimension lines	no	no	yes
Curve construction	Bezier, freehand	Bezier, freehand	freehand, spline
Range of line weights	hairline – 288 pt	unlimited	.0001 – 100 pt
Object editing			
Select by type	no	no	no
Select multiple points	yes	yes	no
Add/remove points	yes	yes	from polygon and freehand
Fills	blends, tiled art, bit map, PostScript	blends, tiled art	8-color bit map
Smooth	by individual points	new freehand lines	yes
Split/join	split anywhere/join	split anywhere/join	no
Distort	no	no	no
Skew	yes	yes	no
Scaling	numerical, proportional, manual	numerical, proportional, manual	proportional, manual
Scale or retain line weights	yes	yes	retain only
Precision features			
Align objects	yes	no	yes
Distribute objects	yes	no	yes
Area calculation	no	no	no
Measurement units	in., pt, cm, pica, mm	in., pt, pica	in., ft, miles, pt, metric, pica,
Rulers	yes	yes	yes, customizable
Snap To option	grid, point	point	grid
Show dimensions	no	no	yes
Text handling			
Maximum point size	unlimited	unlimited	127
Mixed fonts/styles per block	yes	no	yes
Full justification	yes	no	yes
Rotate to any degree	yes	yes	yes
Skewing	yes	yes	no
Text on a curve	yes	no	no
Bit-map handling			
Colorize	yes	no	any 2 primary colors
Auto-trace	yes	yes	no
Resolution range (dpi)	72 to 1,270	72	RAM-limited
Import/export formats			
PICT	import	imports for tracing only	import/export
TIFF	import, 1 bit and gray scale	no	no
EPSF	import/export	imports but can't edit	no
Other	imports Illustrator 1.1	NA	imports MacDraw 1.9



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Table 2, continued

	SuperPaint 2.0	MacDraft 1.2b	PowerDraw 3.0
Minimum system	Mac Plus, 2 floppies	Mac 512K, 2 floppies	Mac Plus, hard drive
Price	$199	$269	$795
Maximum document dimensions	6" x 6"	48" x 48"	48" x 48"
Maximum open documents	10	4	RAM-limited
Colors available	8 add/sub primaries and b/w	b/w	256
Color-specification system	NA	NA	NA
Color separations	no	no	no
Zooming range	25% – 800% as fat bits	6.25% – 800%	unlimited
Named views	no	no	yes
Maximum layers	1 paint, 1 draw	NA	RAM-limited, named
Hide layer	yes, also lock objects	lock object	yes
Restack layers	painting always backmost	NA	yes
Special lines and curves			
Arrowheads	yes	yes	yes
Dashed lines	yes, editable	one type, plus patterns	yes
Dimension lines	no	yes	yes
Curve construction	Bezier, freehand, spline	spline	Bezier, freehand, spline
Range of line weights	hairline – 8 pt	8: 1 – 14 pt	unlimited
Object editing			
Select by type	no	no	yes
Select multiple points	yes	no	yes
Add/remove points	yes	polygons only	yes
Fills	2-color bit map, dir. and radial in paint	b/w bit map	bit map, directional, radial
Smooth	yes	yes	yes
Split/join	split anywhere/join	no	split anywhere/join
Distort	yes, paint layer only	no	yes
Skew	yes	no	yes
Scaling	numerical, proportional, manual	proportional, manual	numerical, proportional, manual
Scale or retain line weights	retain only	no	yes
Precision features			
Align objects	yes	yes	yes
Distribute objects	no	yes	yes
Area calculation	yes	yes	yes
Measurement units	in., pt, cm, pica, pixel	in., ft, metric	yes
Rulers	yes	yes, scalable	yes
Snap To option	grid	grid	grid, point, object
Show dimensions	yes	yes	yes
Text handling			
Maximum point size	127	72	127
Mixed fonts/styles per block	yes	no	yes
Full justification	no	no	yes
Rotate to any degree	yes	90° increments	yes
Skewing	yes	no	no
Text on a curve	no	no	yes
Bit-map handling			
Colorize	1 color for paint layer	no	yes
Auto-trace	yes	no	no
Resolution range (dpi)	72 – 2,540	72	RAM-limited
Import/export formats			
PICT	native format	import/export	import/export
TIFF	yes, imports 1-bit TIFF	no	no
EPSF	exports Beziers to Illustrator	no	yes, via macro
Other	Stationery, SuperPaint 1.0/1.1	NA	NA

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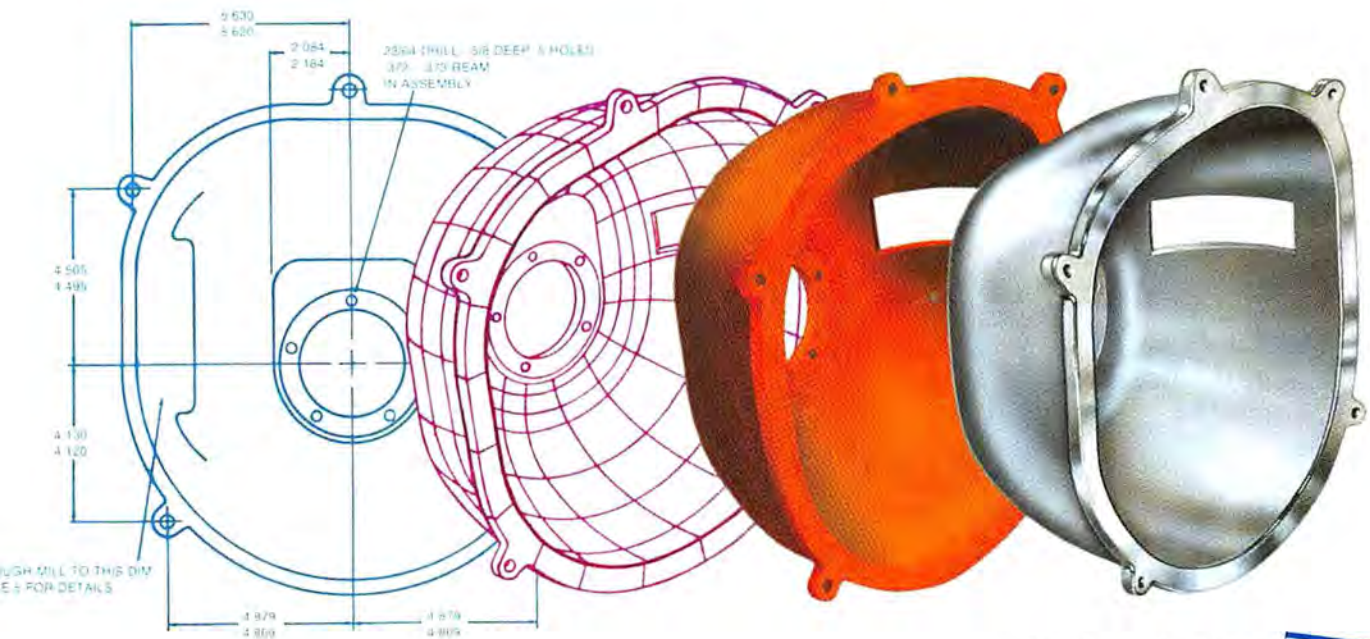
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Drawing the Line

Table 2, continued

	UltraPaint 1.0*Beta
Minimum system	Mac Plus, 2 FDHD or hard drive
Price	$199
Maximum document dimensions	9' x 9'
Maximum open documents	RAM-limited
Colors available	256
Color-specification system	RGB, HLS
Color separations	no
Zooming range	12% – 800%
Named views	no
Maximum layers	8, paint/draw mix, named
Hide layer	yes
Restack layers	no
Special lines and curves	
Arrowheads	yes
Dashed lines	yes
Dimension lines	no
Curve construction	Bezier, freehand, spline
Range of line weights	hairline – 10 pt
Object editing	
Select by type	yes
Select multiple points	only for deletion
Add/remove points	yes
Fills	2-color bit map, PS grays, others
Smooth	yes
Split/join	split anywhere/join
Distort	yes
Skew	yes
Scaling	numerical, proportional, manual
Scale or retain line weights	yes
Precision features	
Align objects	yes
Distribute objects	no
Area calculation	no
Measurement units	in., pt, cm, pica
Rulers	yes
Snap To option	grid
Show dimensions	yes
Text handling	
Maximum point size	127
Mixed fonts/styles per block	yes
Full justification	no
Rotate to any degree	yes
Skewing	yes, but prints as bit map
Text on a curve	no
Bit-map handling	
Colorize	256-color painting
Auto-trace	yes
Resolution range (dpi)	75 – 600
Import/export formats	
PICT	import/export
TIFF	import/export
EPSF	no
Other	StartupScreen, MacDraw 1

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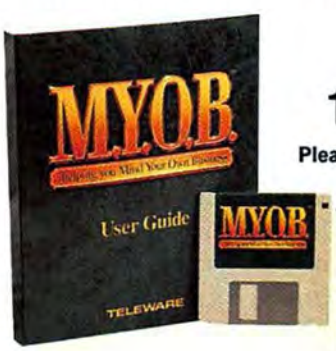
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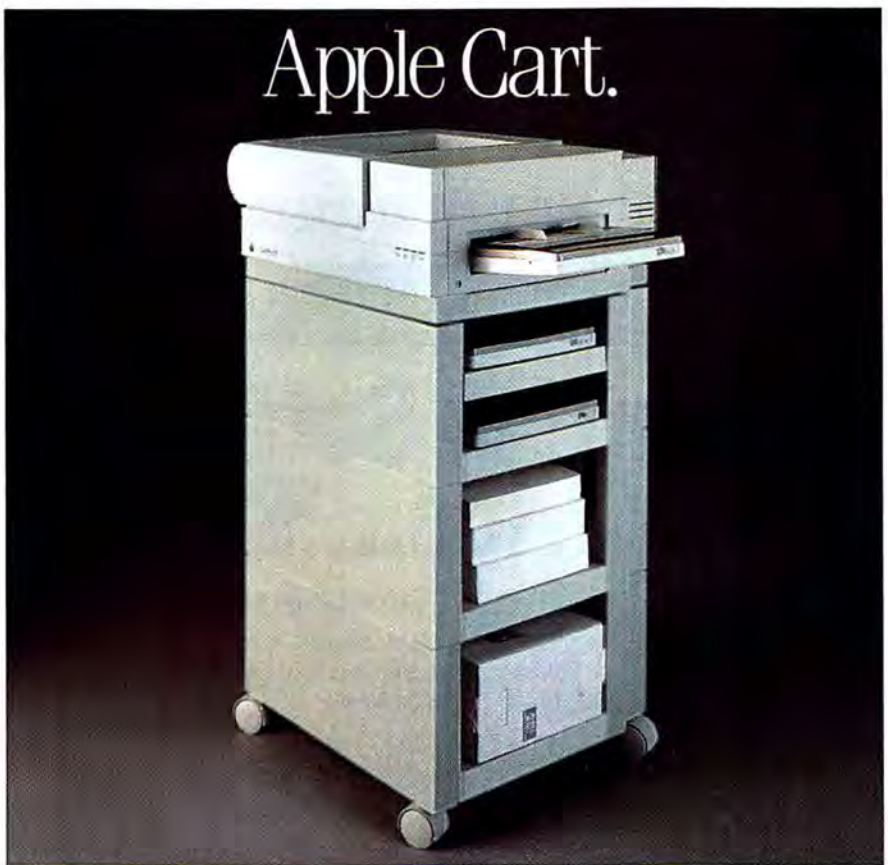
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PostScript effects such as smooth graduated fills, patterns, masks, blending, and text manipulation are responsible for much of the polish you see in drawn art. For such effects, choose a PostScript-oriented program such as FreeHand or Illustrator. Another choice is to assist other drawing programs with a PostScript special-effects accessory such as SmartArt or TypeAlign from Emerald City Software. Your output device must be able to understand PostScript. The LaserWriter series (except for the IISC) can do the job, as can many third-party PostScript printers. Freedom of Press gives you PostScript effects from non-PostScript devices.

All drawing programs have some degree of *color capability*. The most limited ones are MacDraw, with its eight ditherable colors, and DeskDraw and SuperPaint, both with even more limited eight-color capability. SuperPaint lets you see colors only in a noneditable preview. Canvas and Dreams are capable of producing up to 16.8 million actual undithered colors, and Dreams lets you dither pixels into intricately textured fill patterns. An eight-bit color system is quite adequate for screen display.

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BETA ! UltraPaint 1.0

Based on the beta version we used, we got the following impressions of UltraPaint from Deneba Software: It strives to be an all-purpose graphics program. It's an integrated tool that emphasizes painting, but its drawing abilities pack substantial punch. Working in up to 256 colors, it features everything from Bezier curves, shape cutting, and gluing to high-resolution gray-scale photo retouching. UltraPaint can be customized with add-on tool modules such as programmable brushes, special effects, special shapes, device interfaces, and so on. Its customizable auto-trace module bridges the worlds of painting and drawing.

UltraPaint's drafting aids include eight layers; named views; document size as large as 9.3 x 9.3 feet; independent horizontal and vertical grids; alignment tools; 12-to-800-percent zooming; accuracy to 1/600 inch; arrowheads; a wide range of custom line weights; numerical scaling; and object duplication with numerically specifiable shifting, scaling, and rotation. The beta version lacks dimension lines and an editor for dashed lines and arrowheads. The package will sell for $199 and should be available by the time you read this.

Out software from Berkeley Systems simulates a large screen on a small monitor — an excellent low-budget alternative. Your hard-copy output device should faithfully support the available color range. A wide-page color ink-jet printer is a good, economical choice. For page proofs that include PostScript effects, you'll need a higher-priced color PostScript printer or a printer supported by Freedom of Press.

If your end result is a publication that's printed with a four-color process, you'll need *color-separation capabilities*. Canvas, FreeHand, Illustrator, and MacDraw can produce color separations of an entire document. Illustrator's separation utility is a stand-alone application that's responsible for much of the four-color output you see in *MacUser* and other publications. Canvas now comes with a separation utility that reads and separates documents as well as converts them to EPSF or Illustrator 1.1 formats. You can proof color separations with LaserWriter output and produce a test page with a PostScript printer, but the proper hardware for color separations is a high-resolution imagesetter.

If your needs are more mechanical than artistic, you may opt for a general-purpose drawing program such as Canvas or Dreams, for its precision and measuring tools. You might need to move to a full-scale CAD package. Professional users with big plans may need a plotter.

The Bottom Line

Because drawing programs are called on to do so many tasks, it would be foolish to think that one program is the best without considering a user's needs, expertise, and working style. As an everyday workhorse, **SuperPaint** might do, but I gravitate toward **Canvas**, which lets me painlessly do almost anything I want in color and monochrome. For type-intensive or mixed-format art, I go running to **FreeHand**. When the job calls for PostScript effects such as blends or masking, I seek out **Illustrator**'s dream-come-true smoothness. **Dreams** is a good option when your needs focus on dimensioning and heavy-duty precision. On a 1-megabyte Mac, Canvas, SuperPaint, and FreeHand handle their domains with room to spare. **DeskDraw** and **DeskPaint** are permanent residents on my Mac's Apple menu because they're so darn handy.

Salvatore Parascandolo is *MacUser*'s graphics editor. He prefers graphics programs to video games, and considers some to *be* video games. Adventure, animation, frustration, surprises, clues, and tricky maneuvers — graphics programs have it all.

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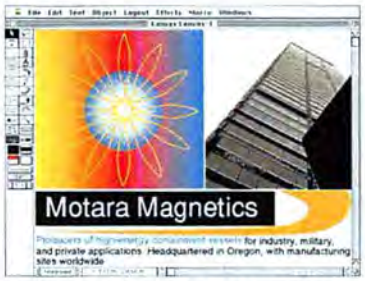
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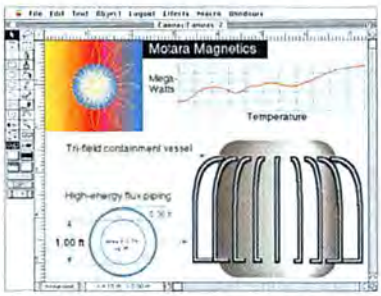
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Report Cards



Canvas' shape and color transformations were used to produce every element of this logo, from the blended background to the rotated Bezier curves that form the "petals." A gray-scale TIFF file was imported and scaled. Canvas supports mixed sizes and colors of text in a block.



Canvas' rulers, dimension lines, and dashed lines come in handy for technical applications. You must size the dimension lines, and their numbers change automatically when the lines change length.

Canvas 2.1 ★★★★★

Canvas is a multitalented, full-color drawing program with respectable painting abilities. Its latest upgrade adds infinitely improved Bezier curves, a dashed-line and arrowhead editor, a spelling checker, and a color-separation utility. Canvas also comes in a DA version that has fewer abilities than the stand-alone program.

Canvas is rich with useful features: Its color capabilities and powerful object-editing options are combined with a friendly interface and ease of use.

With Canvas' unlimited layers and object-handling powers, you can mix paintings and objects. Each painting is treated as a floating easel that can be repositioned. Moving between layers — or hiding and showing each layer — is an easy one-step process.

Pros: The objectlike handling of imported bit maps enables you to stack bit maps and objects together for a combined visual effect, yet you can still edit separate components. The Paint function allows you to edit bit maps in TIFF, PICT, and MacPaint formats. You can import full-color PICT2 paintings into Canvas and color-separate them with the rest of the document.

You can use precision features such as independent x-y grid snaps, dimension lines, floating rulers, numerical scaling, and a magnification range to 64x. This arsenal enables Canvas to act as a light-duty CAD package in a pinch.

You can install custom elements such as complex assemblies, logos, templates, and signatures in a Macro menu to create a library of ready-made parts.

Canvas lets you change an object from one type to another before editing it. Polygons, rectangles, ovals, and freehand lines can become Bezier curves, and Bezier curves can become polygons. Text can turn into a bit map, and bit maps can turn into noneditable picture objects.

Cons: You can't edit color paintings pixel by pixel. Text can be scaled, squashed, stretched, rotated, and printed at high resolution. If the text is skewed or distorted, however, it prints as a coarse bit map, even if you specify a PostScript typeface.

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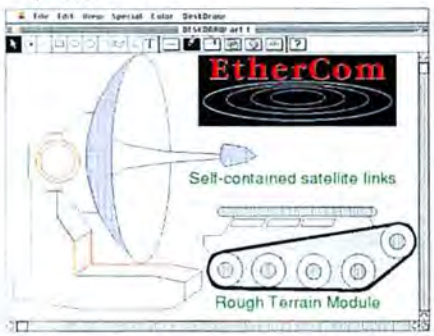
DeskDraw DA ★★★½

This nicely balanced DA utility from Zedcor is an economical ticket to the world of drawing programs. Smaller than 100K in size and considerably more powerful than Apple's original MacDraw, DeskDraw is bundled with DeskPaint. DeskPaint is a very handy eight-color painting DA that's packed with useful features. It can serve nicely for impromptu drawing or sketching work, especially on 1-megabyte Macs.

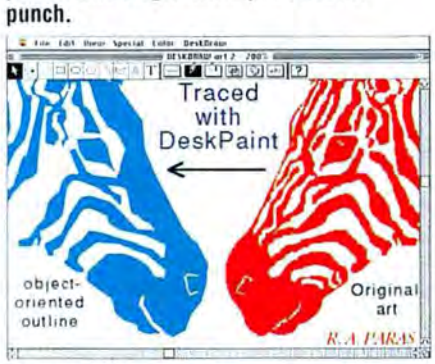
Pros: DeskDraw has a nicely appointed tool palette and puts its other features within reach via one hierarchical menu and several intuitive keyboard command equivalents. It has several elegant touches, including smooth-polygon reshaping, free-rotation of polygons and rectangles around a specified center point, key-driven zooming, and support for hairlines, which can help any drawing look much more polished when printed on a laser printer. A grid can be used to construct or evenly position objects, and an alignment tool helps with precision chores. DeskPaint can auto-trace bit maps and export the object-oriented outlines to DeskDraw. DeskDraw can import (but not edit) 1-bit TIFF and MacPaint art through the Clipboard, and it opens PICT files directly.

Cons: DeskDraw doesn't work at top speed with drawings that contain hundreds of objects, but these instances are generally rare. It rotates ellipses, bit maps, and text only in 90-degree increments. It lacks arrowheads and dimension lines.

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DeskDraw is a DA that works with eight colors. It has power touches such as polygon smoothing, grid snaps, free rotation, and object alignment. Its tool palette and single menu pack a lot of punch.



DeskDraw's bundled DA, DeskPaint, was used to auto-trace this bit map. Both the bit map and the object-oriented trace were brought into DeskDraw and colorized. Note the smoothness of the enlarged object versus the jagged bit map.

Dreams 1.0 ★★★½

Dreams is a full-color drawing application that straddles free-form design and CAD. The CAD part is easy to reach, because the auxiliary tool palette puts many common functions such as rotation just a click away. For serious CAD work, Dreams has precision features, including one that all drawing programs should have: It can automatically extend one or more lines to intersect a distant line perfectly.

Dreams initially presents a standard-looking basic tool set, but most shape primitives such as the circle and the curve offer several pop-up variations. You can draw a circle, for example, by diameter or radius, or by specifying three intersection points. The customizable parallel-line tool makes short work of drawing walls, piping, and pathways. You can obtain or create libraries of often-needed objects, and they are accessible through a dedicated browsing function.



Dreams has strong dimensioning powers. You click on two or more points of an object, and it creates complete dimension lines, which automatically change when you resize the object. Layers, rulers, and a handy double-line tool simplify space planning.



Dreams' broad color selection and its editable 32-x-32 bit-mapped patterns let you make textures to your heart's content. One flaw is that rotated and disproportionately resized object groups begin to disintegrate.

Pros: Dreams offers associative dimensioning. Its dimension-line tool creates witness lines (leading from the shape to the measurement line) and distance values between key points in a drawing. Dimension values, including point-to-point distance and area calculation, are automatically updated whenever the associated object changes. You can even drag the dimension numbers into a table, and Dreams updates the numbers if dimensions change.

Dreams offers multicolored bit-mapped fill patterns, in formats from the commonly used 8-x-8-pixel to 32 x 32 pixels. Each dot can be a different color, which allows vast texturing possibilities.

Dreams' unique shape-editing talents include polygon sides with center handles so you can reposition a side in one action, dragging both its vertices with it. Different shapes can be merged together or subtracted from each other in one move, and polygons can be split into their component lines.

Dreams features a PictScript exportation option, which will let you place, but not edit, Dreams-produced art in other programs while retaining many of the finer attributes, such as line weights of less than one point, and smooth curves that are normally lost in conversion to the generic PICT format.

Cons: Dreams can convert several object types into other ones, such as Bezier curves to splines. But whereas Canvas strives to maintain the original shapes, Dreams doesn't. If you convert a polygon to a Bezier curve, all the corners become smooth curves. You can't reshape a hybrid object or convert it to another form. Dreams shares MacDraw II's bug of shattering rotated object groups when they're proportionally resized.

Dreams is uncomfortably slow in responding to a selection click, which takes some getting used to.

Innovative Data Design
2280 Bates Ave., Suite A
Concord, CA 94520
(415) 680-6818
$500



It's hard not to get carried away with FreeHand's gradients and text tricks. The picture is a gray-scale TIFF file that's been contrast-adjusted and masked by a circular shape. The circle of text was made by binding type to a curve in a single step.



FreeHand's no-fuss shape fills are defined with this dialog box. You set the start and end colors as well as the direction of the fill. You can save the definition and use it on multiple objects. If you change an attribute of the fill, all the related objects automatically change.

FreeHand 2.0 ★★★★½

FreeHand, one of the staple Mac applications, is best for creating object-oriented PostScript-based fine art and single-page layouts that contain native art as well as imported graphics. A FreeHand document has 200 layers, in which you can organize graphic elements to your heart's content. If you use text in your artwork, you'll welcome the program's rich set of typographical controls. These controls, along with the layering system and drawing, editing, and importing strengths, make FreeHand a good choice for many design purposes.

FreeHand's interface is similar to those of other popular drawing programs, with familiar line and fill menus and ways of stretching, grouping, aligning, and distributing objects. Although it's

Report Cards, continued

somewhat slow, FreeHand applies real PostScript effects to your art, lets you operate in a WYSIWYG mode, and can do productive work even on a 1-megabyte Mac. With enough RAM, you can backtrack through edits with multiple levels of Undo. Even if you seldom use it, this feature's a real lifesaver when it's needed.

Pros: FreeHand is the only program in this roundup that offers one-step effects such as directional and radial graduated fills. These effects, once set up, can be selected by name from a menu. Styles also apply to line attributes. Conveniently, FreeHand treats your named properties like style sheets so that if you edit an attribute of an existing color, line, or fill effect, all the objects that are assigned that effect also change (provided they weren't otherwise transformed).

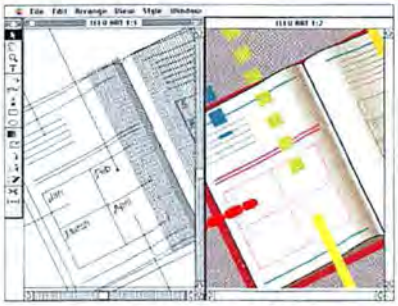
Typographic tricks are FreeHand's forte. You can scale, slant, and rotate a text block as you would any other object. With the right combination of modifier keys, you can adjust word spacing, letter spacing, and leading. You can even make a line of text follow a curved path, using a variety of alignment options.

Masking is also simple in FreeHand. You select and cut the picture items, select a frame, and use the Paste Inside function. After pasting you can even resize or reshape the cropping frame. FreeHand redisplays the image in its recropped form. If you resize, slant, or rotate the frame, the contents change with it.

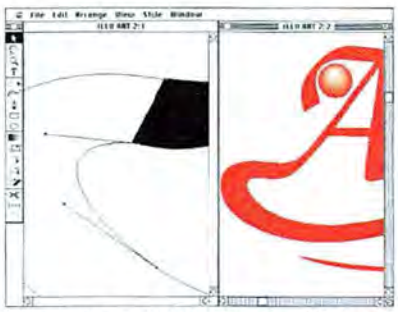
Documents from other applications saved as PICT files can be imported as noneditable items. Directly opening a file converts objects to FreeHand's fully editable native format.

Cons: FreeHand is somewhat slow at many operations, especially in the preview mode. Some frequently used functions are buried in hierarchical menus. The autotrace feature perceives less detail in a high-resolution bit map than it does when that bit map is expanded within FreeHand, although the inherent detail is the same in either view.

Aldus Corp.
411 First Ave. S.
Seattle, WA 98104
(206) 622-5500
$495



Illustrator makes the rich-looking image on the right from the stark, but easy-working, wireframe version on the left. These views can be simultaneous, so you can see the changes instantly. The book pages are shaded by a masked color-blend. Note the variety of dashed lines.



Illustrator and ATM are powerful tools for combining text and graphics. Illustrator provides excellent working accuracy, even at high magnifications, for perfectly mating hand-drawn objects with scaled text.

Illustrator 88 1.9.3 ★★★★½

Illustrator 88 is a professional graphics tool that works exceptionally smoothly. It excels at simplifying the production of complex art. Although it imports only EPSF files, it is suited for producing everything from decorative art pieces to extensive layouts. It offers a fast working mode, where all lines appear in equal weights and all objects look empty. There's also a noneditable preview mode in which you can see how the finished product will look. You can open multiple windows in one document, with each window in a different mode for a simultaneous working view and live preview. The tool palette looks a bit stark but contains all the essentials. The polished interaction of keys and tools and the smooth screen display make it an addictive program.

Illustrator 88 has a single working layer, but you can lock art to avoid accidental editing. If your document gets crowded, you can hide any number of items. Unlocking one object unlocks all the locked objects, and showing hidden art shows all hidden items. Wisely, all freshly shown or unlocked items are automatically selected, so you can easily deselect what you want to keep and send the rest back into hibernation.

Pros: You can open bit-mapped art such as a scanned image to serve as a tracing template. Whereas most auto-tracers create all possible lines within a selected region, Illustrator draws one line at a time wherever you click on the edge of an area, which provides excellent control.

Illustrator lacks built-in graduated fill effects, but you can do fills by using the excellent shape- and color-blending function to create a series of gradually mutating objects. Much of the technical art in *MacUser* that looks meticulously airbrushed has been created with Illustrator's blends.

Masking is not as straightforward in Illustrator as it is in FreeHand, but Illustrator's method has some advantages. After making a mask frame, you can stack maskable items *on top of* the masked object. The items are cropped automatically, which is convenient for one-subject drawings. Grouping the mask with its contents prevents it from cropping everything. In its wireframe mode, Illustrator doesn't hide the cropped parts of a masked item, so things can look pretty messy. With experience, though, you learn to see through the clutter or hide it.

Illustrator makes exceptional use of Adobe Type Manager's (ATM) font-display abilities by reimaging skewed, rotated, and scaled text based on a recomputed outline, rather than producing a distorted bit map. This gives you a precisely displayed relationship of text and other design elements.

Cons: Illustrator has a steeper learning curve than most other drawing programs. Layouts that contain masks and blended shapes can be extremely cluttered. Its masking method can be tricky. Text handling is less than spectacular, which is surprising, considering Adobe's background with PostScript and type. Native text blocks can contain up to 256 characters, and you can't control spacing between letters and between words. Once created, a text block is treated like any other object — it can be filled, stroked, skewed, rotated, and stretched, but you can't make it follow a curved path.

Adobe Systems, Inc.
1585 Charleston Road
P.O. Box 7900
Mountain View, CA 94039
(415) 961-4400
$495

Business Statistics

Mac users no longer have to depend on spreadsheets to compile and analyze business statistics — a bumper crop of new and improved statistics packages for the Mac is now on the market.

When the Mac entered the business market from its stronghold in the graphics and word-processing markets, it made its first assault with financial, graphics, and report-preparation tools. The invasion has extended to statistics, and now a flock of statistics packages is available, all with different strengths and appealing to different markets. Four of the most sophisticated products are reviewed here (see the "BetaWatch" sidebar for a rundown on three more products).

Abacus Concepts' StatView for the Mac II (and StatView SE + Graphics for lower-end Macs) has been around since 1988, as has Exstatix from Select Micro Systems. Both SAS Institute's JMP and Odesta's Data Desk 3.0, a major upgrade, were released in late 1989.

These packages are not just mirror images of each other — there's a great deal of variety in their range of statistical procedures, interface design, and output. If you can afford to buy only one package, be prepared to make trade-offs: The jazziest package, the one with the best reporting capabilities, or the one that is easiest to learn may lack a data-management or statistical procedure critical for your particular application.

The most common business uses for statistics are discussed in the following sections. Check those related to your needs so you can assess each product's ability to handle your analysis comprehensively.

By Minna Levine

PHOTOGRAPHY: MEL LINDSTROM

Getting Data into Shape

Before any analysis can proceed, you have to get the data into the package in a suitable form. Some analysts prefer to enter data into spreadsheets, others use word processors, and still others have their data in local or mainframe databases.

Good statistical packages not only have analysis tools but also have data-management facilities for creating and editing new data sets; importing data from other packages; and transforming numbers with a wide range of arithmetic, trigonometric, and statistical functions.

Although the packages reviewed here can sort data easily and put it into rank order, they differ in the ease with which you can specify conditional transformations and how flexibly they handle data-set variables.

Data Desk offers the widest selection of functions, a broad latitude for creating conditional transformations, and an unusual method of handling variables — you can type elaborate conditional formulas into the Transformation window without the restriction of having to use selection buttons. The program displays data-set variables as icons in individual scrollable windows rather than in a spreadsheet.

JMP's spreadsheet-data editor is less flexible than Data Desk's, but its Calculator window offers a more visual approach for constructing new variable formulas. You can select variable names and a wide variety of operators and functions, and paste them together.

StatView's list of functions is quite an impressive one, but only limited operators and selection modes are available in its conditional-transformation-formula window. It provides no flexibility for positioning variables in columns, and unfortunately, to correct errors in new variable formulas, you must delete the column and start again.

Exstatix also has an extensive set of functions for transforming variables, although its conditional-language capabilities are less complete than those of the other packages. It offers an initial formula-creation dialog box, which is less flexible than the editable Get Info dialog box that allows changes to be made to variables and/or formulas.

Summarizing Business Activities

The next phase of every statistical analysis involves checking data for errors, getting a feel for distributions, and summarizing patterns.

For this purpose, analysts commonly use descriptive statistics, including mean, median, variance, standard deviation, kurtosis, skewness, frequency count, and percentile. Most spreadsheet programs and statistical software contain at least some of these statistics as well as simple graphics, such as histograms and box plots, to reveal outliers (values not in the same range as most others) and unusual distributions.

StatView has the most complete set of descriptive statistics, with Data Desk a close second. Both offer box plots and histograms, although StatView's graphics are not as flexible as Data Desk's.

Exstatix has all the common summary statistics, but it does not provide complete flexibility for choosing percentiles to assess and it is the only package without histograms.

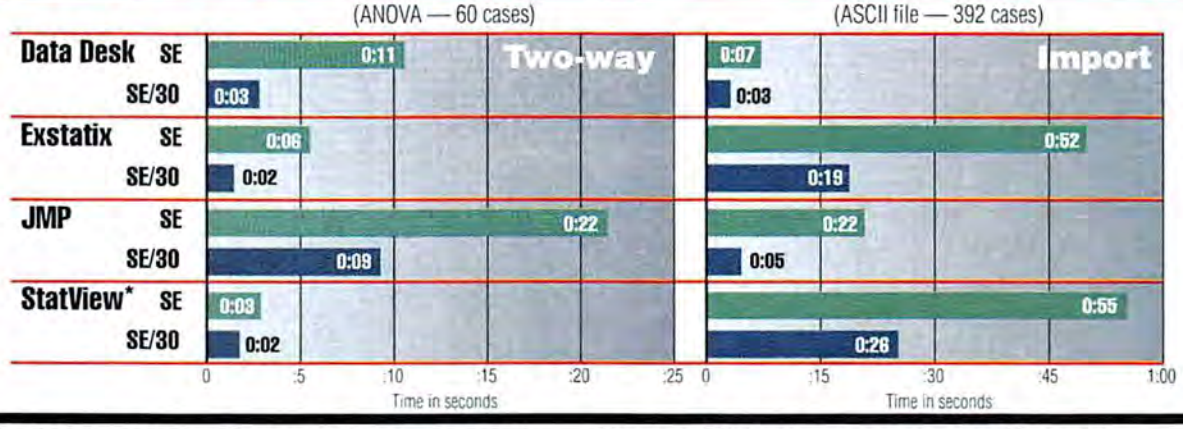
Strangely, JMP omits variance, skewness, kurtosis, and the number of missing values from its list, but you can use its graphic exploratory data-analysis tools to evaluate them.

Predicting Business Outcomes

Business analysts are almost always interested in predicting some aspect of company performance based on known information. For example, marketers might want to estimate how many frozen dinners individuals might purchase at a supermarket, based on their age, sex, weight, marital status, income, and education level.

Almost all statistical software contains procedures for determining

Table 1: Speed Tests



This table shows the time required to complete each task on a Mac SE with 1 megabyte of RAM running Finder only, and a Mac SE/30 with 4 megabytes of RAM. Regression times include computing and saving residuals.

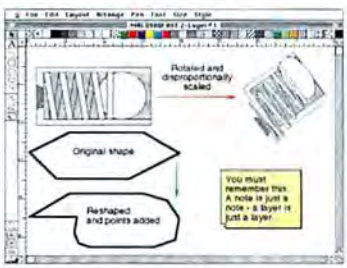
MacDraw II 1.1 ★★★½

MacDraw has long been a household word in the Mac community, but its set of features is still conservative. The drawing and editing capabilities of the latest MacDraw seem geared to the needs of business illustration, as evidenced by (of all things) a spelling checker and an electronic equivalent of Post-it Notes. Special effects, Bezier curves, and color support beyond a paltry eight colors are conspicuously absent. MacDraw's operation is smooth and fast, but the minute you try to overstep the boundaries of its limited abilities, you feel horribly confined.

Pros: Redeeming MacDraw from the lower end of the drawing-program spectrum are features such as unlimited layers that can be separately or jointly edited, named, and restacked; the ability to color-separate its native art; and a well-engineered parts-library mechanism that lets you browse through, seek, and import previously created drawing elements. Its flexible layer management and parts libraries simplify current and complex projects by helping you organize current and previous drawings.



MacDraw can make short work of space-planning projects with its unlimited layers, easy navigation, and parts libraries. Your color choices are limited by what you can dither from a basic set of eight primaries.



MacDraw makes it easy to reshape objects, even unintentionally. The cup/spring/ball unit breaks apart when rotated and scaled disproportionately. The polygon can easily be reshaped by moving, adding, and removing points.

Reshaping polygons is especially easy with MacDraw, and rudimentary dimension lines let you do light CAD such as space or landscape design.

Cons: MacDraw lacks strong tools for shape editing. There's no numerical scaling, which is a must for accuracy and painless resizing, and there's no way to split or join curve segments. That forces you to use kludgey workarounds to remove part of a line, or to combine two painstakingly drawn sections into one. Unlike the other programs in this roundup, MacDraw doesn't let you reshape a smoothed polygon in one action. No objects can go partly off the edge of the drawing area. Operations such as rotation and scaling may cease if part of an object hangs off the edge at all.

One serious bug (coincidentally shared by Claris CAD 1.0 and Dreams) is that when you rotate and then disproportionately resize a group of objects, they will jumble into a poorly fitting mess. The workaround is to resize the group before rotating it.

Claris Corp.
5201 Patrick Henry Drive
Santa Clara, CA 95052
(408) 987-7000
$399

SuperPaint 2.0 ★★★½

SuperPaint rose to high popularity as the first program to offer both painting and drawing tools, with each set working in its own dedicated layer. As its name implies, SuperPaint has considerable painting talents, although its choice of colors is cramped. Instead of unlimited layers, SuperPaint has one layer each for drawing and painting. When one mode is active, its tools can't change the graphics created with the other mode. You can hide the unused layer for an uncluttered view.

A keystroke transfers items between the drawing and painting layers. Painted selections moved to the drawing layer become independent bit-mapped objects that can be freely restacked and repositioned. But drawn objects moved to the painting layer lose their object nature and stay precisely where they appeared in the drawing layer.

Pros: SuperPaint's Bezier-curve tool is smooth and responsive. You can select and move several control points simultaneously. During editing, all the curves' handles disappear so you can see the pure outline. Editable dashes and arrowheads help with light drafting chores.

SuperPaint's text handling is top-notch, with the same scaling, skewing, and rotation effects that Illustrator 88 provides. Unlike Canvas, SuperPaint prints text smoothly whether it's skewed or not.

A multigon object tool allows you to create a regular polygon with any number of sides. The auto-tracing tool is customizable, and auto-tracing automatically produces object-oriented curves in the drawing layer. Tools work at any magnification or reduction.

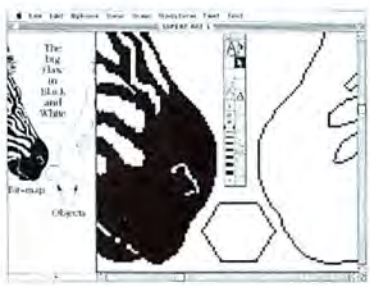
SuperPaint accepts new plug-in tools to add capabilities without an upgrade.

Cons: A zoomed-in view is just a magnified bit map, not a redrawn object, and therefore has a jagged, confusing look. You can see the results only in a noneditable preview. There are no dimension lines for technical-drafting projects. The Superbits interface is klunky. Plug-in tools work only in the painting mode.

Silicon Beach Software
9770 Carroll Center Road, Suite J
San Diego, CA 92126
(619) 695-6956
$199



SuperPaint's multigon object tool was used to make the hexagons. The "atom" is made of Bezier objects. Color is visible only in a non-editable preview.



Unlike the other drawing programs, SuperPaint gives you a magnified bit map for the enlarged view even if you zoom in on drawn objects. Both the painted zebra and its auto-traced object-oriented counterpart look equally jagged at 4x.

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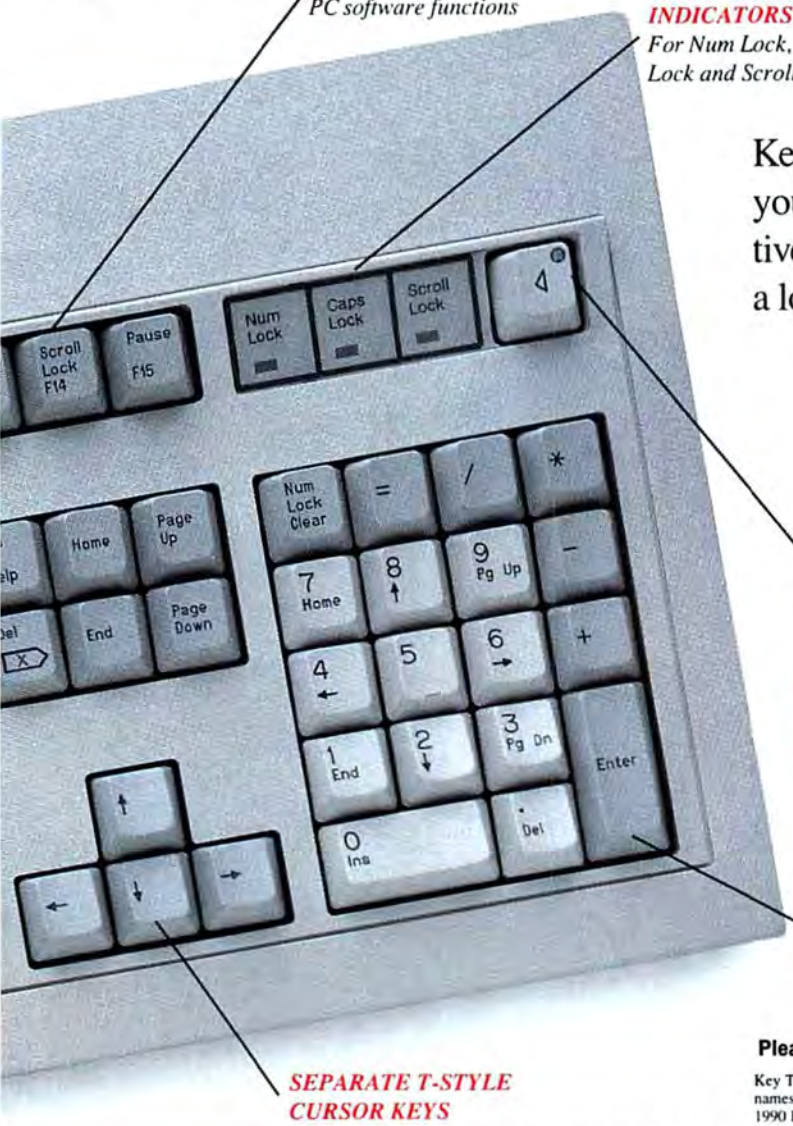
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multiple-regression equations that express such relationships in a linear form. What makes packages in this area stand out is the availability of sophisticated models, such as nonlinear or polynomial models, and of associated diagnostic and graphics procedures for detecting problems with the models (violations of assumptions, influence of unusual or outlying predictors, and distorting relationships among predictors, for instance).

StatView's approach is the most straightforward for simple modeling. After you have selected the x and y variables and the appropriate regression option from the Compare menu, a dialog box appears that has choices for testing and saving residuals and predicted values and the order of a polynomial regression. The Stepwise Regression dialog box lets you specify the criteria for adding variables to or removing them from the model. The program then computes and displays only those models.

Data Desk's regression modeling is more exploratory. You build models by specifying x and y variables, and pop-up HyperView menus offer graphics and residuals testing. You perform stepwise regression by dragging new variables into the model table. Analysts knowledgeable about evaluating a model's appropriateness can open interactive ("hot") windows containing the variable list, residual plots, and correlation tables to instantly observe the effects of adding new variables.

JMP's default regression analyses include leverage plots and summary statistical tables for each independent variable. Although these are helpful for understanding the overall model's fit, the extra overhead slows down the the model calculation considerably when you have several independent variables.

Although Exstatix has a good range of regression models, it's by far the slowest package for multiple linear regression. The stepwise-regression procedure adds or removes all variables rather than stopping when the remaining variables do not meet

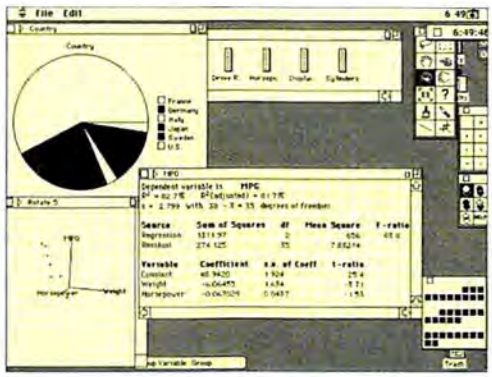


Figure 1: Data Desk excels in the multiwindowing environment. Four variables are displayed on this screen. By choosing the U.S. slice of the pie chart, you highlight those points in the rotating 3-D scatterplot. The plot tools in the upper right are for selecting and adjusting the scatterplot's scale, not for enhancing its appearance.

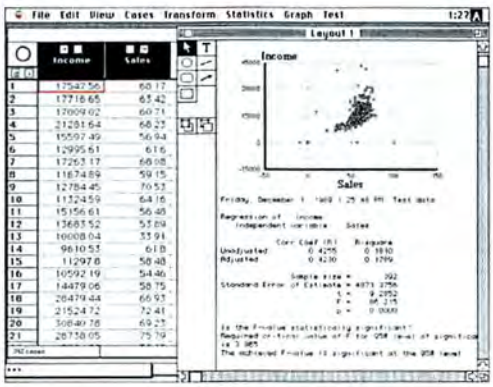
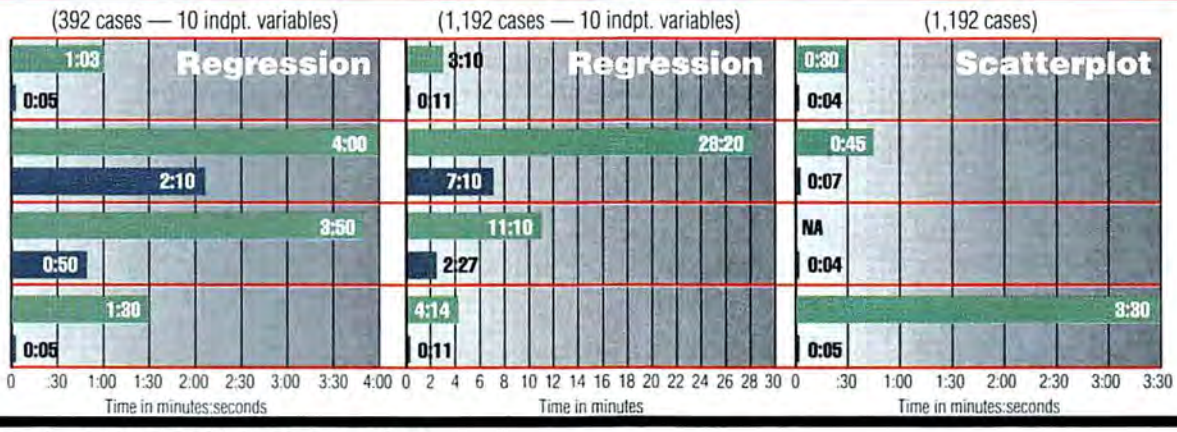
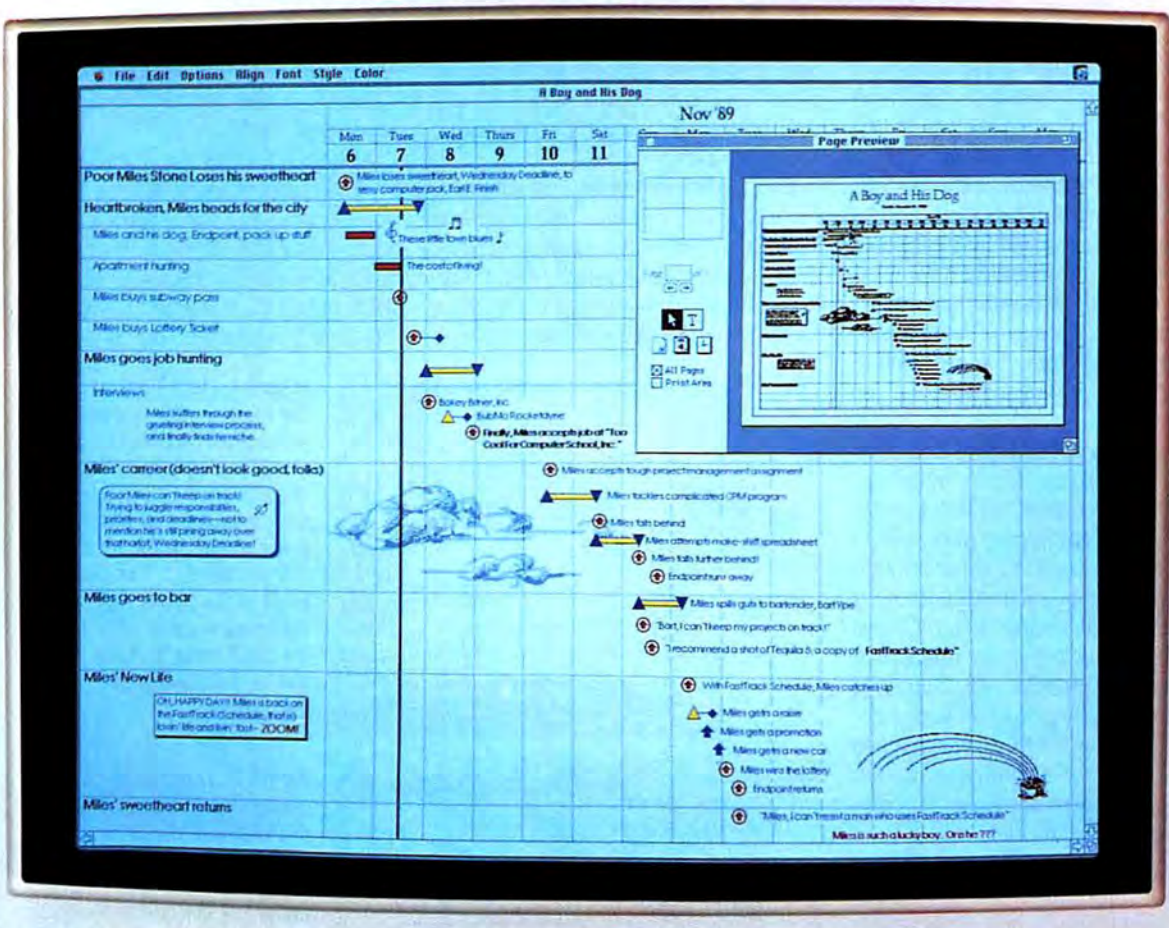


Figure 2: You can combine graphics and analysis tables in Exstatix's Layout window, and you can then reformat the text. Note the advice about the statistical analysis that is included after each procedure.



*StatView II was tested on the SE/30, StatView SE + Graphics on the SE.

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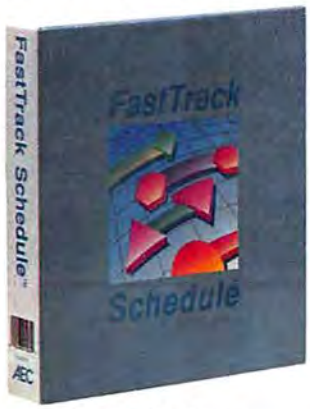
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October, 1989 MacUser Magazine

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preset criteria. These extra calculations and reports, in separate windows for each step, are particularly onerous because the models reformulate so slowly. On the other hand, Exstatix includes an unusual and helpful feature for cross-validating regression models on data subsets.

The packages differ in the additional types of regression models they support. JMP can compute logistic-regression models (for instance, those with binary- or ordinal-dependent variables and those predicting an event's occurrence). StatView and Exstatix can perform regression only on nonlinear models that have been linearized, and Data Desk doesn't support additional regression models at all.

Evaluating Group Differences

New-product testing and ad-campaign evaluations share a common type of research question: Are the observed increases in sales or scores, after the change in context, real and reliable, or are they just the result of chance? This question can be presented as an experimental design with ANOVA (analysis of variance). What distinguishes a package for ANOVA is its ability to handle such complicated circumstances as different numbers of observations under different conditions, unavoidable group variations, and repeated-measures designs (more than one observation by the same person). Most of the best packages for these analyses (except Eddy winner Abacus Concepts' SuperANOVA — see "Fifth Annual *MacUser* Editors' Choice Awards," March '90) require a sophisticated understanding of linear-modeling approaches to ANOVAs, something that is often left out of basic statistics courses.

Data Desk has good modeling capabilities for both ANOVAs and

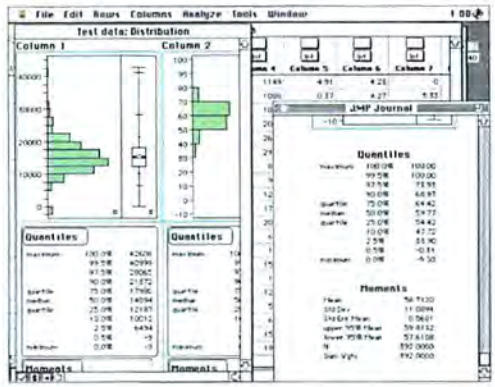


Figure 3: JMP can present statistics and graphics, either displayed or hidden. Text and graphics copied from JMP's output windows to its Journal window cannot be changed.

Glossary

ANOVA (analysis of variance): a method of testing hypotheses about differences in the mean values of one variable across two or more groups. **ANCOVA** is analysis of covariance.

ARIMA (auto-regressive integrated moving-average): a model that characterizes changes in one variable over time. It is used in time-series analysis.

conjoint analysis: a technique of evaluating how people value products or options and what trade-offs they make when not all options are available.

dependent variable: a response variable whose value depends on the values of other, independent variables.

discriminant analysis: a method for finding a set of weights that lets you classify people or things from two or more groups of data into different groups.

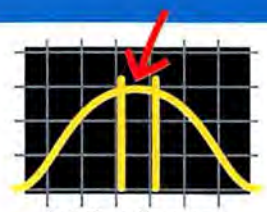
EDA (exploratory data analysis): the use of graphically based tools, particularly in initial states of data analysis, to inspect data properties and to discover relationships among variables.

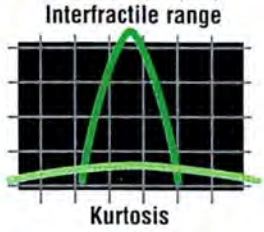
Fourier analysis: a technique used to evaluate the relative importance of different frequency cycles in the pattern of a time series.

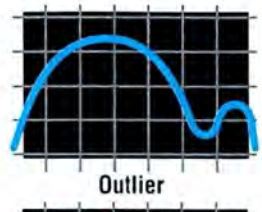
interfractile range: the number of data points between two fractions of a time-series distribution.

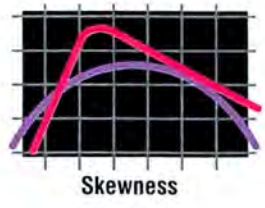
kurtosis: the measure of a frequency distribution's peakedness and breadth.

lag: a transformation of data so that a data point in a time series is equal to the value at the previous point in time.









MANOVA (multivariate analysis of variance): a method to test hypotheses about mean values of groups of variables considered together across two or more groups.

moving average: a technique for removing random fluctuations in time-series plots.

multidimensional scaling: a method of detecting individuals' perceptions of the similarity of objects in a group.

multivariate analysis: the search for associations or differences among measurements of two or more variables that have been analyzed at the same time.

outlier: a value that is unusual and out of typical range.

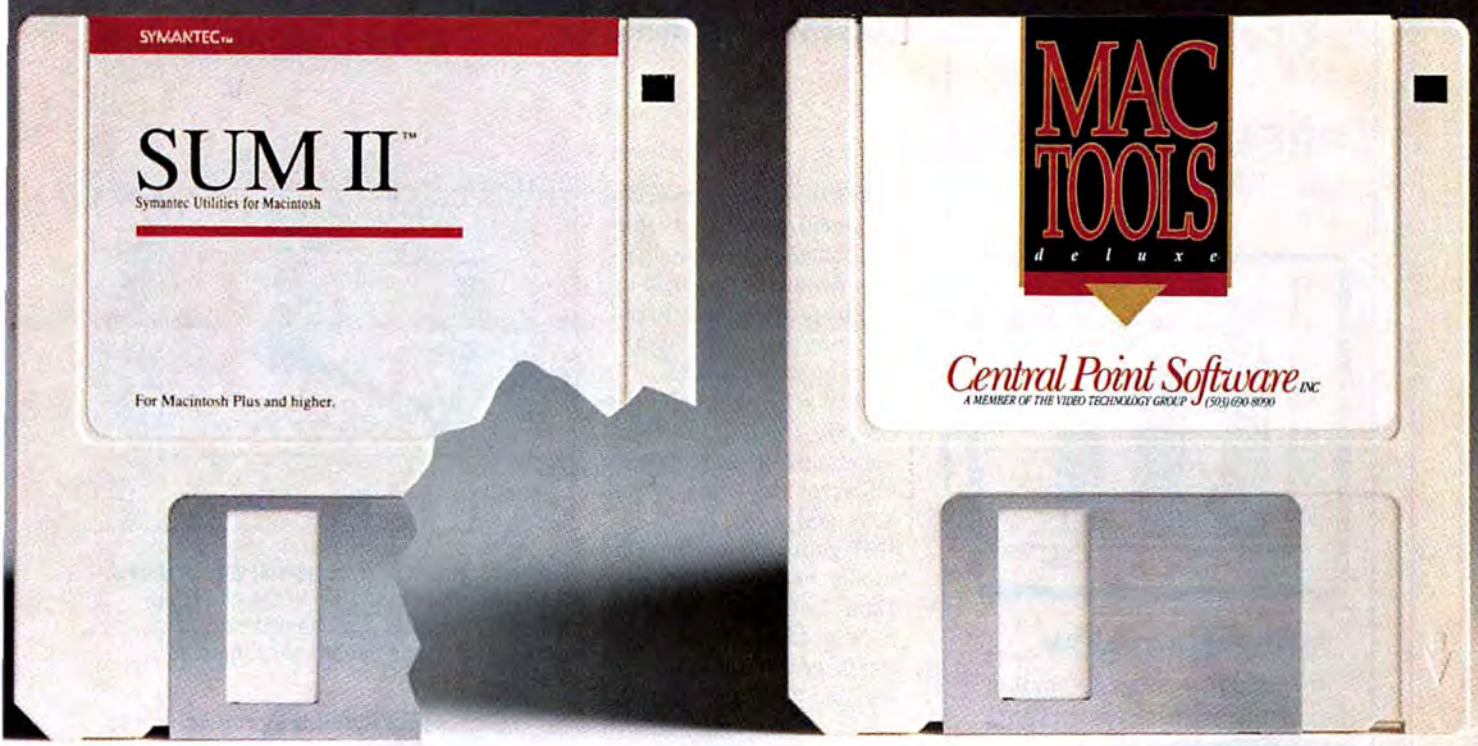
multiple linear regression: a procedure that provides a description (in the form of a linear equation) of the relationship between a single continuous variable and a group of independent variables.

repeated-measures design: an experimental design in which more than one measurement of the same variable is taken from an individual.

scatterplot: a graph on which observations are plotted with respect to two (or three) variables.

skewness: a measure of the degree of asymmetry of a frequency distribution.

time-series analysis: a way of measuring the change in one or more variables over time. ARIMA is a type of time-series analysis.



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ANCOVAs (analyses of covariance), although its ability to handle repeated-measures designs is poor. Pop-up menus provide model-construction aids by listing the more common models.

JMP's Fit Y by X and Specify Model subcommands also offer great flexibility for modeling ANOVAs and ANCOVAs, but JMP provides less help in model building than does Data Desk. The weakest package in this area is Exstatix: Its procedures are minimal and hard to specify.

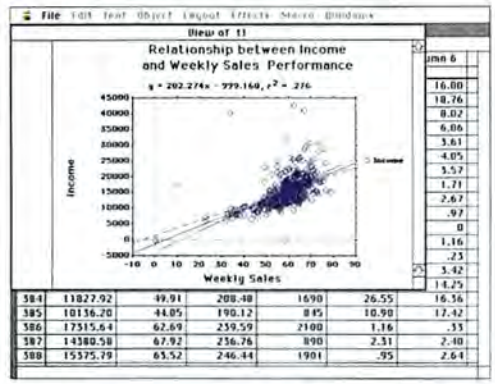


Figure 4: Charts made by default with StatView II are the most attractive and can be embellished. The View window cannot expand to include text from other analyses, however.

Analyzing Trends

Predicting future market trends with data analyses collected over time depends on careful assessment of business activity independent of a firm's management, such as seasonal variations in the market. Procedures for handling time-series data management and statistical-analysis needs are specialized applications and are often not included in general statistical software.

Although Exstatix has no tools for deseasonalizing data directly nor for isolating and removing other trends, its tools for time-series transformation include moving average, lag, lead, difference, and indexing to a range of values.

Data Desk, StatView, and JMP can't analyze time-series trends, but the three packages discussed in the "BetaWatch" sidebar are all able to perform such analyses.

Understanding Market Segments

Market researchers rely heavily on questionnaires to learn about customers' demographics and buying behavior. They analyze most survey data by using tables that show the distributions of co-occurrences of answers to pairs of questions (an individual's age and height, for instance). Only a few spreadsheet and database programs, however, are able to handle cross-tabulation reports. Market researchers need not only flexible row and column definition and the ability to count multiple responses to individual questions but also a range of complicated statistical techniques, including cluster, factor, and discriminant and conjoint analyses of group customers or product features.

You can easily construct one- and two-way tables with most of the statistics packages we're considering here, but three-way tables are difficult to construct with all of them. Data Desk provides a means for creating groups with one variable and then doing by-group processing of the other two. The other three packages require you to select each level of the third variable one at a time and then create the cross-tabulation of the other two variables.

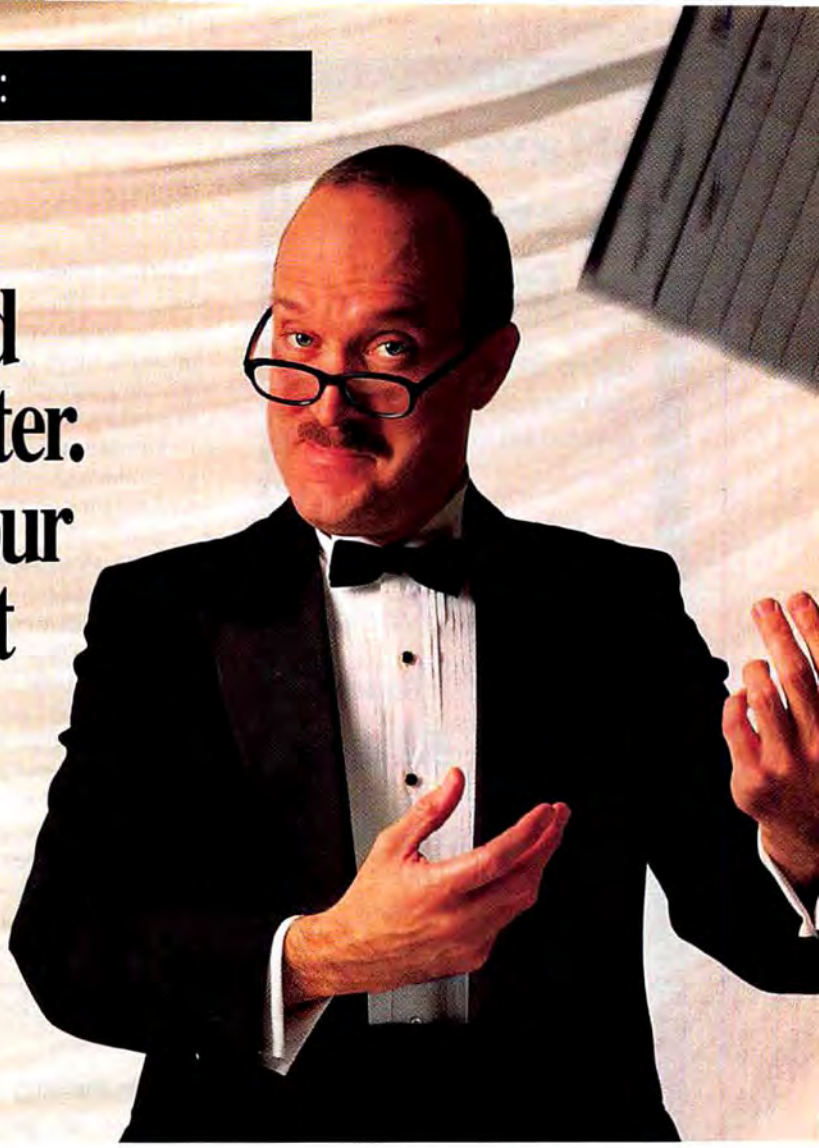
For more-complex statistical techniques, Data Desk provides some tools for exploratory cluster and principal-components analysis: Analysts can use 3-D rotating plots and selection tools to locate groups and common dimensions. The packages in the "BetaWatch" sidebar offer more-complex multivariate techniques for those who need them.

Investigating Data Relationships

The tools for interactive, graphical exploratory data analysis (EDA) in some of these packages let you view

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data from many angles — for instance, by using 3-D plots — so that you can detect errors or novel relationships, investigate them further, and manipulate them. You can draw different conclusions about data distributions from graphs with different axis settings (see the "Spreadsheets and Statistics Packages Face Off" sidebar).

Data Desk and JMP excel in these areas. They both provide a range of graphing types for investigating data, and they also provide graphics tools that can eliminate outlier cases, detect cases that you highlight on-screen, and expand or contract a plot's axes interactively rather than having you fill in a dialog box.

Exstatix offers only two types of EDA graph — a box plot and a rotating 3-D scatterplot — and its manual gives instructions only on the use of screen button functions. Because its graphics are not interactive, StatView's exploratory techniques are also weak.

Facing the Interface

One of the major differences among these packages has to do with their user/data interface. They can be compared in two ways: the extent to which they use Mac-like menus, buttons, and dialog boxes and the degree to which they use a context-sensitive multiwindow environment.

With Data Desk, you can open any number of windows and tile them on the desktop. You can then link them so they are hot, or sensitive to changes or subselections in another window.

JMP's interface has many of these window and button features, but analyses in different windows cannot be linked as tightly as in Data Desk to reflect data changes or new variable selections. Its design encourages data exploration, but at times the program makes too many decisions about the analysis for you.

Exstatix specifies all procedures with menu selections and/or dialog boxes and remembers them for future analyses (although you must relaunch new analyses). More than one output window can be open at a time, but data changes made in one window are not reflected in the others.

StatView's analysis specifications are similar, but the output window (containing a graph or a table, for instance) updates to a new analysis after you change variables. Only one analysis window can be open at a time, so you can't look at related graphics and text simultaneously.

Presenting Results

All the products vary considerably in the visual quality of their output. If you have graphics software and a powerful word processor or desktop-publishing program and enough memory to switch among them and the statistics software with MultiFinder, you can create presentation-quality tables and charts. But your choices are more limited if you want the output to look good when you send it directly to a printer or if you want to be able to embellish graphics and tables with the statistics package.

Exstatix's output is best, because its Layout window is the most functional. The output window's default tables are rudimentary, but you can get around that by copying text and/or graphics from other windows into the Layout window and embellishing them with text and draw tools.

JMP and StatView have better default graphics and text than do Data Desk and Exstatix, but JMP's Journal window contains no editing tools and StatView does not allow combination of text and graphic windows.

Data Desk's layout facility has no text or graphic tools and permits only a single page of output.

The decision tree that accompanies this article (see Figure 5) will help you determine which product, alone or in combination, is best for you. But whichever package you choose, both you and your Mac will be better equipped to help your business grow.

Minna Levine is a statistics and market-research consultant who frequently writes about PC and Mac statistics software.

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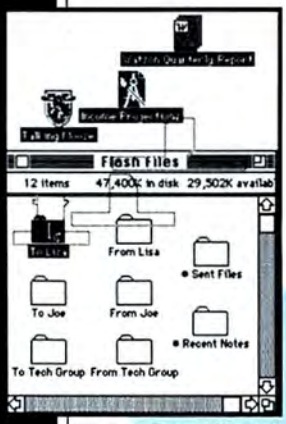
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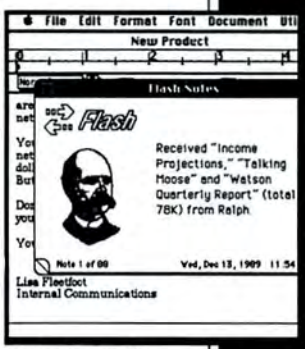
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When this review was written, the following trio of important statistics packages were still in beta test: Minitab Statistical Software, SPSS for the Macintosh, and SYSTAT 5.0 for the Macintosh. All were due to ship in the first quarter of this year.

In certain areas, these programs shine: They can import data, including data lists with commands, from nondelimited files with more than one record per case and from ASCII files (only SYSTAT has a spreadsheet editor for direct data manipulation); construct three-way tables; handle a variety of complicated stastical techniques; and carry out batch processing, which lets users doing repeated analyses submit an extensive series of commands at one time rather than individually.

One major drawback is that these products' output capacity and appearance are often limited, and only SYSTAT makes adequate use of the Mac interface and mouse.

Minitab Statistical Software 6.1

Minitab is a straight port of the large-computer and PC command-driven package used frequently in educational and government installations.

It has good procedural capabilities, including some time-series-related plots and ARIMA forecasting, but it doesn't have depth in any one area. Although it has commands to create EDA displays, these graphics are static and are printed with characters rather than with lines.

Later versions will focus more on output quality and true Mac capabilities. The current version makes minimal use of the mouse and windows, having just one window for commands as well as output. Menus and dialog boxes serve only for file operations and editing.

Overall, Minitab is recommended only for those who need compatibility with mainframes and PCs.

Requires 1 megabyte of RAM, System 4.2 or later, Finder 6.0 or later, hard-disk drive, and 2.5 megabytes of disk storage space (Mac Plus version doesn't support color; version for Mac II series and SE/30 [Minitab II] supports math coprocessor). $695. Minitab, Inc., 3081 Enterprise Drive, State College, PA 16801; (814) 238-3280.

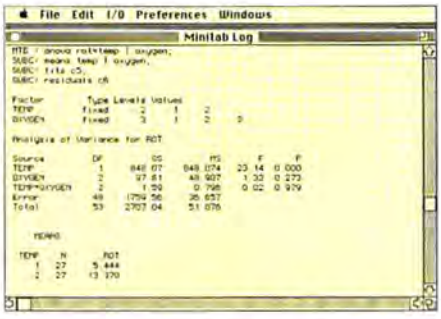


Figure A: With Minitab, all commands, analyses, and graphics are printed in one output window. You cannot change the fonts, but you can edit text.

SPSS for the Macintosh

The SPSS port from mainframes to the Mac makes advanced multivariate and tabular procedures available — it's the first package to offer conjoint, correspondence, and reliability analyses. It's also the only Mac statistics product that provides truly flexible cross tabulations with commands for unusual banner and stub creations and direct handling of multiple-response or dichotomy questions (two ways of coding that allow individuals to check more than one answer in a multiple-choice question). It includes the most commands for prespecifying diagnostic tests and plots.

Unlike most other statistics packages, SPSS includes multivariate analyses — such as factor, principal components, cluster, discriminant, reliability, conjoint, and correspondence — all of which are frequently used by market researchers and analysts. It also has a Trends module for time-series analyses.

The package can compute logistic regression models (such as binary- or ordinal-dependent variables and those predicting an event's occurrence). It has a hierarchical menu system that pastes commands into an input window. You can completely specify all analyses with these menu selections and a few dialog boxes (although typing commands directly is simpler).

However, SPSS doesn't have many Mac features and it has poor-quality output. As with Minitab, you cannot improve the output's visual quality, although there is an interesting rectangular cut-and-paste facility for rearranging table columns and doing other text editing. SPSS says it plans to compensate for the limited graphic ability by signing an agreement with Computer Associates that will let users launch Cricket Graph from within SPSS.

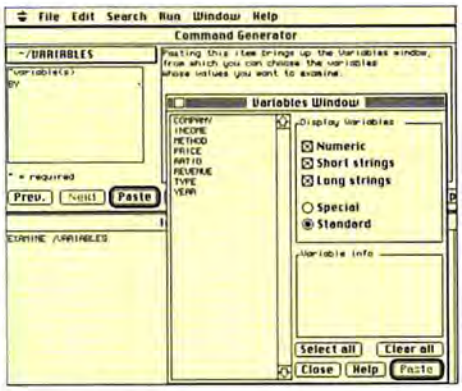


Figure B: SPSS' command generator is a hierarchical menu system that constructs commands for procedures from menu selections and dialog boxes.

Requires SE or later with at least 2 megabytes of RAM (4 megabytes recommended); uses a math coprocessor if present; base system requires only 6 megabytes of storage; 20 megabytes needed for all options; color not included in base package's graphics. Base system, $795; $395 for each of the following options: Advanced Statistics (discriminant analysis, MANOVA, loglinear, survival, probit, nonlinear regression); Trends (ARIMA, X11, spectral analyses, multiple-curve fitting, time-series plots); Tables (flexible presentation-quality cross tabulations); and Categories (conjoint, two-way, and multiple-correspondence analyses; plan cards for conjoint analyses; fractional-plan designing). SPSS, Inc., 444 N. Michigan Ave., Chicago, IL 60611; (312) 329-3300.

SYSTAT 5.0 for the Macintosh

SYSTAT, a powerhouse of multivariate procedures, has actually been available in earlier versions since 1983. In its latest incarnation, it has a more Mac-like interface and fully integrated data, graphics, and analytical procedures. It has a good selection of descriptive statistics, although they are spread out among three or four menus.

The package's multiple general linear-hypothesis dialog boxes specify all univariate or multivariate general linear models, including most ANOVA, MANOVA, ANCOVA, and discriminant designs.

SYSTAT has comprehensive facilities for time-series analysis and extensive true nonlinear-modeling procedures, Fourier analysis and

ARIMA models, and options for smoothing data and deseasonalizing, detrending, differencing, and tapering the series. It also has a complete selection of multivariate statistics and is the only package with multidimensional scaling.

Many of its EDA-graph types are interactive, and you can embellish its graphics windows with text and draw tools, although you can't add text from other analysis windows.

SYSTAT has two output windows that can open simultaneously as its data and command windows, but they must be redrawn or recalculated if data changes.

Requires SE or 68020/68030-based system with 4 megabytes of memory; supports color. $795. SYSTAT, Inc., 1800 Sherman Ave., Evanston, IL 60201; (708) 864-5670.

Related Products
FASTAT

This is a less expensive version of SYSTAT that has fewer procedures and allows smaller data sets.

$195. SYSTAT, Inc., 1800 Sherman Ave., Evanston, IL 60201; (708) 864-5670.

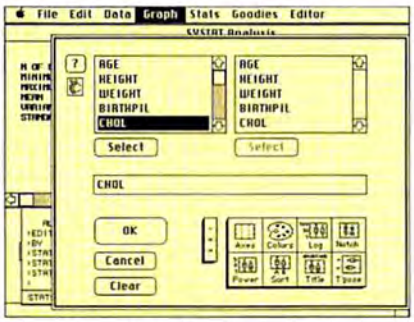


Figure C: In SYSTAT 5.0, variables for graphs are selected above and graph embellishments are selected from dialog boxes called up by a click on the appropriate box.

MacSS/Statistica

MacSS is an inexpensive general statistics package with meager data-management and graphics capabilities but excellent ANOVA. A major upgrade, to be called Statistica and due out at midyear, will feature a new interface, new graphics, and new statistical routines.

MacSS, $119; Statistica, $245. StatSoft, 2325 E. 13th St., Tulsa, OK 74104; (918) 583-4149.

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Spreadsheet and Statistics Packages Face Off

Business analysts who do their number crunching with spreadsheet programs probably don't appreciate what a good statistical package can do for them.

After all, spreadsheet programs tend to have longer lists of functions and data-transformation capabilities than do some statistics packages. In addition, most statistical procedures *can* be implemented in spreadsheets, although this requires complicated macro programming, such as using Heizer Software's Excel templates for statistical functions or the extensive analysis macros (for such things as curvilinear regression or forecasting) printed in PC and Mac trade publications.

Statistical packages usually require little or no programming, and they provide procedural and graphical tools for direct analysis not available in spreadsheet programs. Statistical packages have procedures for checking data for reliability both before and after it is analyzed, can measure the probability of finding data patterns by chance, use well-tested algorithms and high-precision calculations, and often signal assumption violations or ill-founded models.

The following stock analysis pits a spreadsheet program (Microsoft Excel) against two of the statistical packages reviewed here (Data Desk and JMP) to demonstrate some of the advantages statistical packages can have.

Getting Data into Shape

The data set includes columns (variables) with the following information for each stock: industry, price/earnings ratio, closing price, week's net change, annualized yield, and week's sales volume.

Data is entered so that each stock is in one row and has a value for each column. Although several statistics packages have spreadsheetlike editors, spreadsheets' range formatting, block cutting and pasting, and multicolumn-formula capabilities are generally superior. Statistics packages also usually have fewer financial functions than spreadsheet programs do, although newer packages such as JMP provide a calculator window for constructing elaborate conditional transformations (see Figure D).

Using JMP, a new categorical variable is created that reflects the level of trading activity on the basis of the existing-weekly-sales-volume variable.

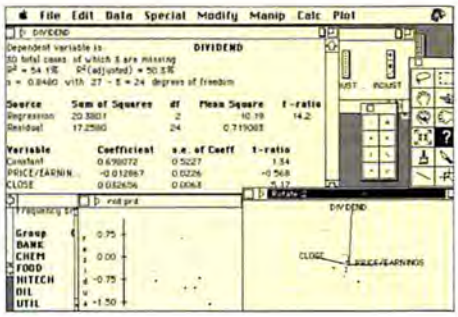
Summarizing Business Activity

Statistics software provides many more tools than do spreadsheet programs for checking data accuracy, examining the variability of values in each column, and looking for systematic relationship patterns among variables. It offers long lists of measures, such as dispersion (variance, standard deviation, interfractile range), location (arithmetic and weighted means, median, mode, minimum and maximum percentiles), and asymmetry (skewness, kurtosis). Some packages also provide tools for examining the distribution of values in great depth.

Figure E, created with Data Desk, demonstrates that two histograms of the yield variable can give two different impressions of the skewness of the value distributions and the presence of outliers. If such precautionary checks are not made, many data-distribution assumptions associated with particular statistical tests may be violated and the results' validity may be sacrificed.

Predicting Outcomes with Regression

Is it possible to predict which stocks will have high dividends? For example, how much dividend variability is accounted for this week by a stock's price/earnings ratio and its closing price? Securities analysts' research requires



F

modeling the relationships among many stock characteristics as well as doing more-elaborate time-series analyses (examinations of fluctuations of stock and market prices over time).

In the simplistic model developed with Data Desk (see Figure F), you can see that the dividend value can be predicted by the stocks' closing price. However, a glance at the residuals plot with the food groups selected will show you that the model overpredicts the group's dividends.

Similar analyses can be performed with some spreadsheet programs but only with the extra cost of third-party templates or extensive programming.

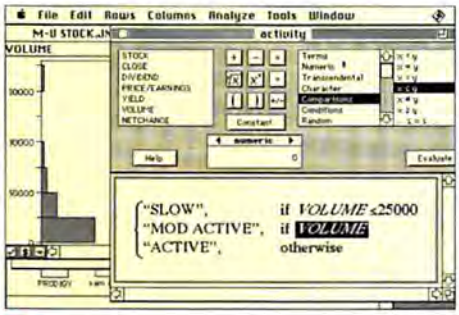
Evaluating Differences with ANOVA

Questions about what factors account for the variability in dividends can be analyzed with general linear-model procedures such as ANOVA and ANCOVA. Does the magnitude of a stock's dividends vary as a function of its industry? Are the industry differences merely a function of the price relationship that 's already detected?

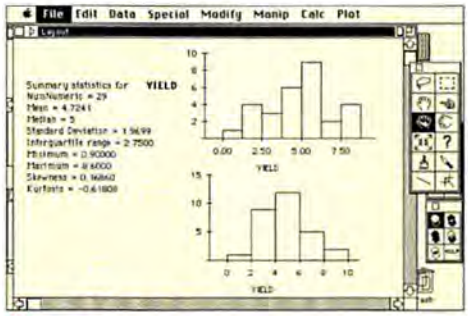
In Figure G, an ANCOVA procedure was performed with Data Desk to answer these two questions. Different industries apparently have different average dividends, and dividends are related to the closing price. The price/earnings ratio is not related to the dividend size in this group of stocks.

Creating a Cross-Tabulations Table

Sometimes average scores in different market segments are less interesting than is a count



D

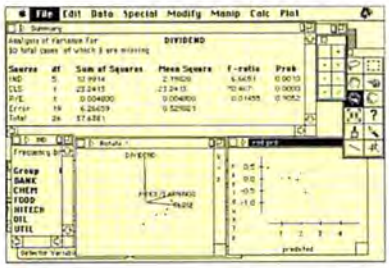


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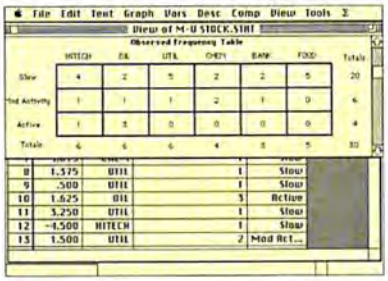
of subgroups' frequency in the data set.

Because we've already created a new activity variable, we can now create a cross-tabulation table for activity and industry to address this issue (see Figure H).

For example, you may prefer to know how many high-technology stocks were active rather than just finding out their average. Cross-tabulations are difficult, if not impossible, to perform in spreadsheet programs, yet they are easy to calculate with statistics packages.



G



H

Conclusion

The above analyses were not only easier with statistics packages because of reduced programming demands, but also the packages' graphic and analytic tools guided some of the questions asked.

The JMP histogram (see Figure D) helps determine reasonable activity cutoffs where no arbitrary ones exist. The Data Desk selection tools (see Figures E, F, and G) helped differentiate patterns in different industries and helped determine which industries the regression model appeared to fit better. On the whole, spreadsheets cannot provide insights into these issues.

Statistical Macro Package, $79; Multiple Linear Regression, $25; Time Series, $20. Heizer Software, P. O. Box 232019, Pleasant Hill, CA 94523; (800) 888-7667.

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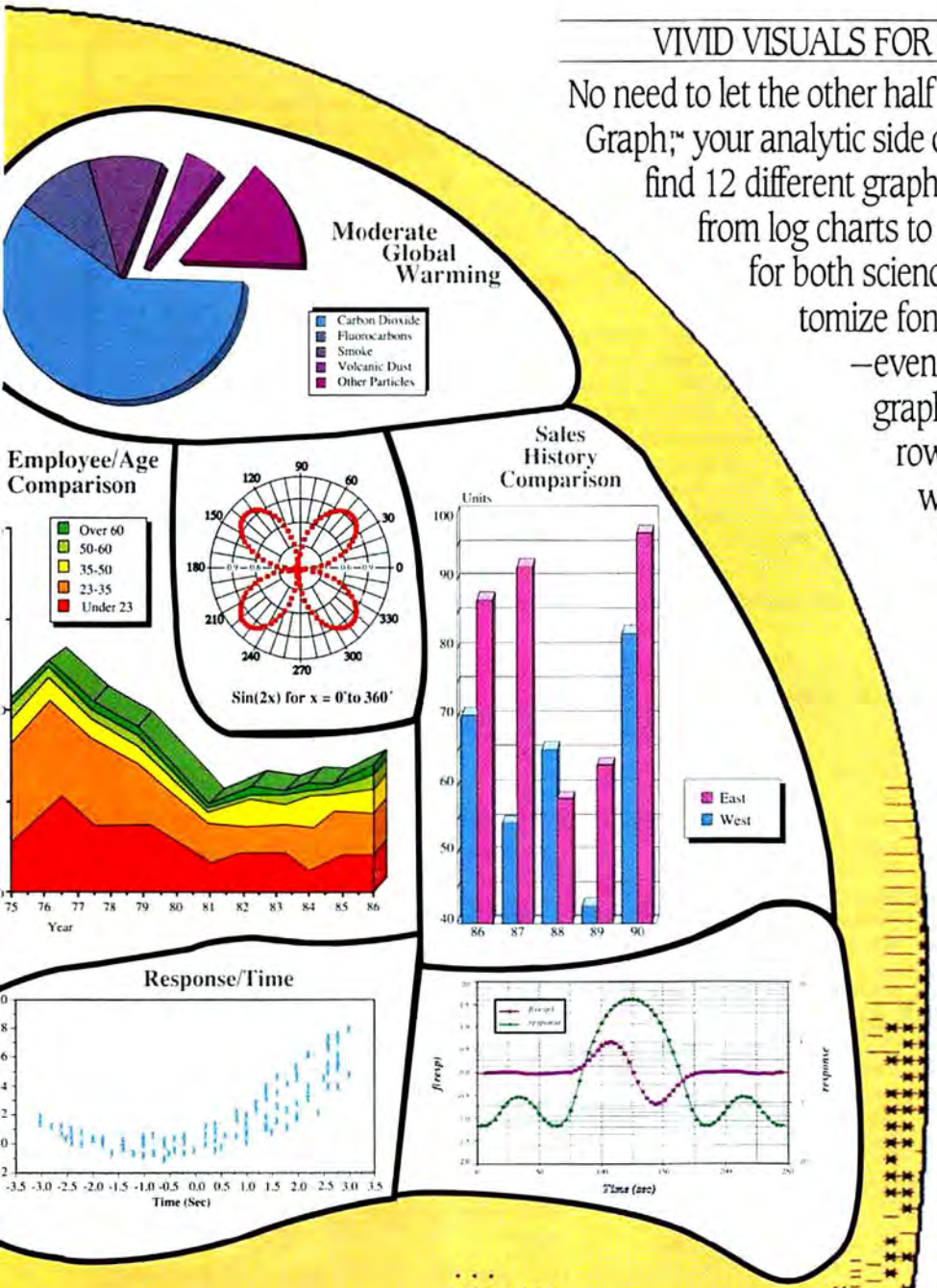
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SuperANOVA

Although Data Desk and JMP have good ANOVA facilities, these products pale beside Eddy winner SuperANOVA, a new product by Abacus Concepts (which also makes StatView). SuperANOVA's ability to specify ANOVA designs, as well as other methods of linear modeling such as MANOVA and ANCOVA, and most post hoc comparisons and planned contrasts make it superior to the ANOVA offerings available in the general packages reviewed here. It can also easily compute cell means and create effects plots.

SuperANOVA has a novel interface that combines the flexibility of recalculating screens and the permanency of being able to save all analysis settings for later use in "Do-It" files.

$495. Abacus Concepts, 1984 Bonita Ave., Berkeley, CA 94704; (800) 666-7828.

The Bottom Line

Macintosh statistics products are notable for their diversity, ranging in sophistication from those capable of exploratory interactive graphics to those with command-driven interfaces, from those offering simple output tables and analytic graphics to those with modifiable presentation-quality layout facilities, and from those providing basic statistics to those with long lists of complex multivariate procedures.

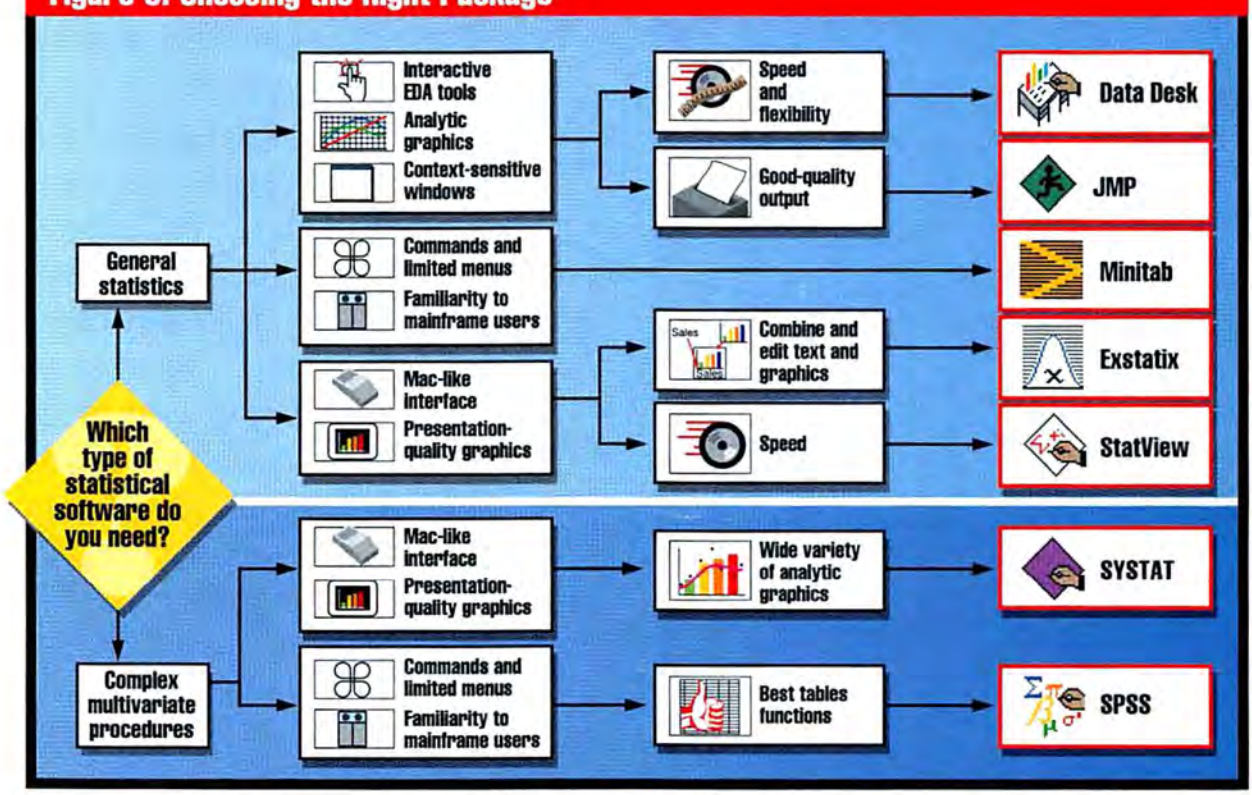
Data Desk provides a powerful and speedy graphical environment in which you can explore data relationships with innovative color use, dynamic windows and plots, and layout and note-taking facilities. It's more limited in its statistical procedures than are most of the other packages, however, and doesn't have presentation-quality graphics.

JMP is similar to Data Desk, but it has better-looking output, more limited control of analyses, and fewer available procedures. Its approach to specifying procedures differs greatly from that of the other packages.

StatView and **Exstatix** have the most attractive output and graphics. StatView is more well rounded in terms of speed and availability of procedures and functions, but Exstatix's Layout window and formula editing are superior.

There is no clear winner among these packages because of their diverse qualities. Consider the analyses you are likely to need, the availability of other graphics and page-layout software (to compensate for output inadequacies), your data-analysis training, and the likelihood that you will take the time required for thorough exploratory data analysis. Ultimately, analysts who crunch numbers for a living can work more efficiently if they own more than one of these packages.

Figure 5: Choosing the Right Package



Start at the top of the chart with the category that best describes your statistical needs, and follow the arrows to end up at the package that offers the features you prefer. For instance, if you're a longtime Mac user who wants interactive exploratory data analysis (EDA) capabilities but doesn't need any other advanced multivariate or tabular procedures (such as conjoint, correspondence, or reliability analyses), start at "general statistics" and follow the arrows to Data Desk if you're looking for speed and flexibility, or JMP if output quality is important.



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Data Desk 3.0 ★★★★

An excellent package for sophisticated analysts, Data Desk provides interactive graphics smoothly and quickly and offers procedural tools for exploring relationships among data points. Its interface is easy to use, and ample advice is available in its well-written documentation and on-line help. Color can be used in graphics.

Pros: Best exploratory interactive graphics. Solid data handling. New Layout window helpful for arranging output.

Cons: No econometric procedures or presentation-quality graphics, displays, or tools. Limited nonparametric procedures and multivariate procedures. Single-line-per-case data-file restrictions for importing.

Requires: Mac 512KE or later (1 megabyte of memory recommended) and two disk drives, one 800K or larger.

List Price: $595.

Odesta Corp., 4084 Commercial Ave., Northbrook, IL 60062; (800) 323-5423.

Exstatix 1.2 ★★★

Exstatix, the leanest of the general statistics packages, has an adequate selection of statistics procedures, good color graphics, and a report-layout facility for merging and customizing charts and statistics tables. Beginners will find its explanations of statistics tables in the report windows helpful, and more-advanced users will appreciate its data-management capabilities, case-grouping tools, and time-series-transformation functions. Exstatix provides tools for adding supplementary external modules.

Pros: Good presentation-quality graphics and layout-window capabilities for output. Good data-transformation functions and nonparametric procedures. Comments in report windows can be viewed on-screen or printed.

Cons: Limited ANOVA, slow regression, and limited multivariate procedures. Few exploratory graphical or statistical techniques.

Requires: Mac 512KE or later and System 4.1 or later.

List Price: $349.

Strategic Mapping, Inc., 4030 Moorpark Ave., Suite 250, San Jose, CA 95117; (408) 985-7400.

JMP 1.0 ★★★½

JMP's approach to specifying procedures is so different from that of other software that it may be confusing. It includes less-frequently-used statistical procedures, such as logistic regression, while ignoring more common ones such as Spearman rank correlation and factor analysis. Color is available for graphics.

Pros: Good data-management and interactive exploratory graphics tools.

Cons: Slow regression. Limited multivariate and nonparametric procedures.

Requires: Mac Plus or later with at least 1 megabyte of RAM (2 megabytes recommended).

List Price: $695.

SAS Institute, Inc., SAS Circle, Box 8000, Cary, NC 27512-8000; (919) 677-8000.

StatView II and StatView SE + Graphics ★★★★

StatView was the first statistics package for the Mac, and it remains the quickest and most well rounded, but it's missing some interactive graphics and interface advances. (An upgrade due this summer, which will incorporate some of its sister product SuperANOVA's innovations [see the "SuperANOVA" sidebar], will restore its position in the market.) Both versions support color.

Pros: Easy-to-use interface and excellent presentation-quality graphics. Good selection of transformation functions and descriptive, nonparametric, and general statistics.

Cons: Data-transformation capabilities not very flexible despite a long list of functions. New exploratory interactive techniques unavailable. Tables and graphics must be viewed as separate output.

Requires: StatView II requires a Mac II or SE/30; StatView SE + Graphics works with the Mac SE, Plus, and 512KE (with 1 megabyte of memory).

List Price: StatView II, $495; StatView II and SuperANOVA, $650; StatView SE + Graphics, $350; StatView SE + Graphics and SuperANOVA, $575.

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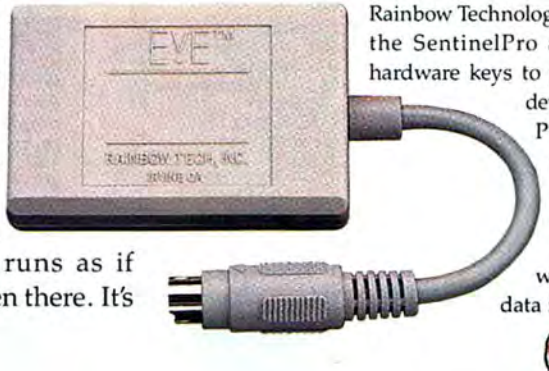
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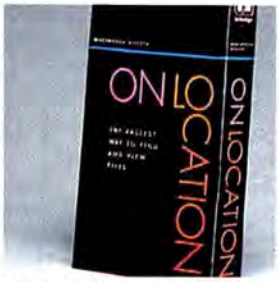
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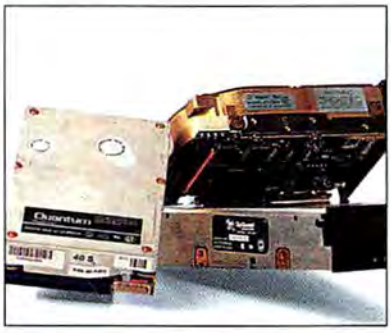
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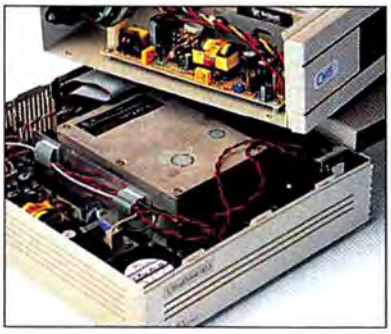
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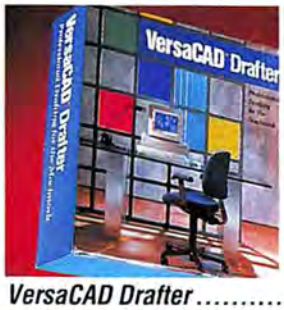
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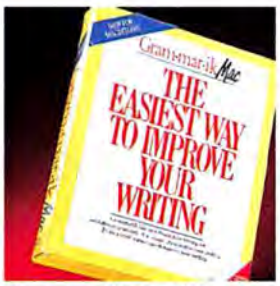
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GemKit (allows user to put Gemini 020/030 Accelerators in Mac+, 512kE, 512k, & 128k. Includes internal fan, SCSI port, and space for extra RAM memory) 149.

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Infinity Optical 600 Mb ... 3,998.
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SCSI Thickwire Ethernet 849.

Farallon - PhoneNet

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DIN-8 (10 Pack) 198.
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Kinetics

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MacTech

ZoneNet - DB-9 or DIN-8 17.

Nuvotech

NuvoLink SC 345.
Turbo Bridge 318.
Turbo Net - DB-9 22.
Turbo Net - DIN-8 21.
Turbo Net ST - DB-9 30.
Turbo Net ST - DIN-8 30.

Shiva Corporation

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NetBridge 339.
NetSerial 279.
TeleBridge 348.

TOPS

Flash Card (TOPS Dos) 158.
TOPS FlashBox 109.
TOPS Repeater 119.

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Df0300 (720k) 605.
Df0400 (1.44Mb) 685.

DaynaFile - Dual Drive
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MIDI Transport 309.
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Inside Macintosh, X-Ref 9.
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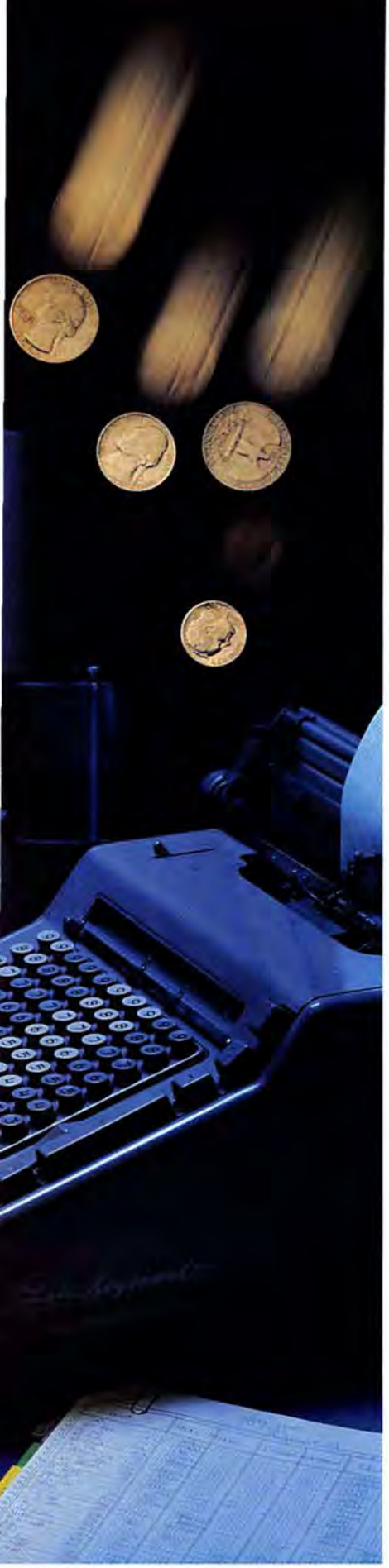
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Time Billing





Time Is Money

Four time-billing packages that help self-employed entrepreneurs keep the cash flowing in.

Art directors, copywriters, consultants, and heads of small ad agencies have found that going into business for themselves with a Macintosh is easy; the hard part is getting paid accurately and on time. A good time-billing package can make it easier. Billing software for small-business owners should measure up to certain standards. To begin with, you shouldn't have to be a CPA to operate the program. The software should be able to deal with a variety of client payments, and the program must be very forgiving, so that a moment's inattention doesn't cause disaster. Next, bill formatting should run the gamut from "send lots of money" to a breakdown of items in excruciating detail. Finally, the program should allow you to mark up supplies and services by a standard percentage. This article will cover four time-billing programs, from low-end performance to high.

Focal Point II

If I were giving an award for best art direction, it would have to go to HyperCard-based Focal Point II, a general office-organization tool from TENpointO that includes a specialized billing function. For this review, however, I'll concentrate only on the billing function, which doesn't perform quite up to my expectations.

There are several annoying data-entry requirements that make the program a pain to use. For example, to post a bill, every blank on the card must be filled in, whether it's relevant or not.

Batch entry of hourly billing is agony. Each "time sheet" card can represent only one day. You can't simply create a new card and specify the date. Instead, you must hop around to find the right card and enter the time there. And you have to enter the exact hours you started and ended the job, not just the total number of hours you worked.

Focal Point II also has some glaring omissions. There is no place to enter sales tax for automatic calculation of hours or expenses. You have to figure the tax yourself and enter it manually on each bill. You also risk causing a real sensation in your client's accounting department when every bill you send regards itself as sui generis — you can't print a consolidated bill that lists every current project, with subtotals, for a given client.

Reporting has never been a strong point in HyperCard applications, and Focal Point II is no exception. You can't send a bill to the screen to check for errors before you actually print it. And there is no way to alter the report

By Michael R. Shannon

PHOTOGRAPHY: TOM UPTON

Which Database ?

4 th DIMENSION now offers the easiest-to-implement relational capabilities ; its overall functionality and programming capabilities may make it the first real Macintosh database standard.
INFOWORLD, September 1989





4 th DIMENSION outshines all the other databases with its number of features and rich database development environment (...) Of the current programs, 4 th DIMENSION is the most complete and powerful.
BYTE, January 1990

Given that 4 D was the first program to allow database designers to build a Macintosh interface, Acius has the advantage of experience over its competition.
MacWEEK, June 1989





ACIUS has created a rich environment for database users at all levels.
MACWORLD, January 1990

4 th DIMENSION 2.0 is a rare treat (...) You really can create powerful multifile database systems without getting involved in coding at all.
MACUSER, February 1990





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Patrick Chedal

format to suit your individual preferences. You can't alter the format with the run-time version of HyperCard's Reports stack that comes with Focal Point either.

Promising Midrange Programs

The two packages with the best potential for entrepreneurs are Timeslips III (Version 1.1h) by Timeslips, and TimeMinder 2.1.6 by Aatrix Software. Each program comes as both an application and a DA, so owners of older Macs or those without MultiFinder can start doing time billing without leaving their current program. In DA form, these two programs function like taxi meters for Macs: Pull down the DA menu and start the clock, and you're off.

Timeslips III is based on the timesheet metaphor so familiar to ad-agency people and lawyers. When you begin working with the program, you define a resident Timeslips file that contains data on your entire client list. Individual slips for each client are stored in the same file. During the course of a busy day, you fill out slips for different clients and projects, all accessible from the DA.

Both the DA (the TSTimer) and the application (the TSReport) adhere quite well to the Macintosh interface. You originally enter your client information into TSReport. It requires a lot of mousing and menuing around to get the clients entered; activities defined; and sales-tax amounts, markups, and bills formatted — but this is true of all billing programs. Fortunately, the documentation is good, and there is on-line help you can turn to if you get stuck.

Later, when you're entering information on a time slip, you don't have to remember exactly what you put down in TSReport, since the DA lets you select all the pertinent information from user-defined menus. Timeslips' expense slips work the same as the time slips but have places to enter quantities and dollar amounts instead of hours.

Creative Bills While You Wait

One of the nice things about Timeslips is that you can customize descriptions within virtually every part of the program. Unfortunately, the DA is one area not designed for customizing. When you open TSTimer, it displays the last time slip you worked on. Many is the time I merrily entered new information on a slip without realizing I was altering an existing slip. There should be a Preferences menu that would allow you to open to a new slip, the last slip, or slips from a certain client. And if you have made a substantial change to an existing slip, the program should warn you.

Timeslips does make batch entry very simple, so you don't have to enter slips daily. You can copy information fields from the preceding slip with the Clone command and enter total hours on a slip without having to designate exactly which hours they were.

Timeslips allows you to customize descriptions within almost every part of the program.

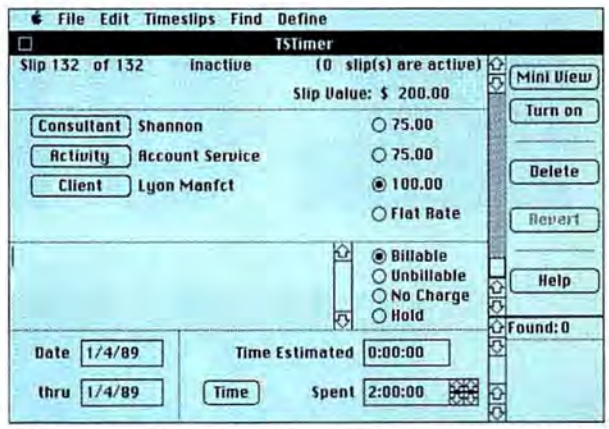
The actual act of billing is where I encountered problems. When you bill one client, Timeslips also sends the bill to all your other clients unless you tell it otherwise. You can decide what slips are included and how they are formatted, through a series of default settings, but you have to manually retrieve the slips each time.

Version 1.1h of the program can't open to a default setting automatically, but Timeslips says this will be possible in version 2.0, due out in March 1990.

To be blunt: TimeMinder is not as



Focal Point II sets a standard for art direction in HyperCard database programming, but HyperCard's limitations as a database program and some of the program's data-entry design make Focal Point II a less-than-ideal choice for small business.

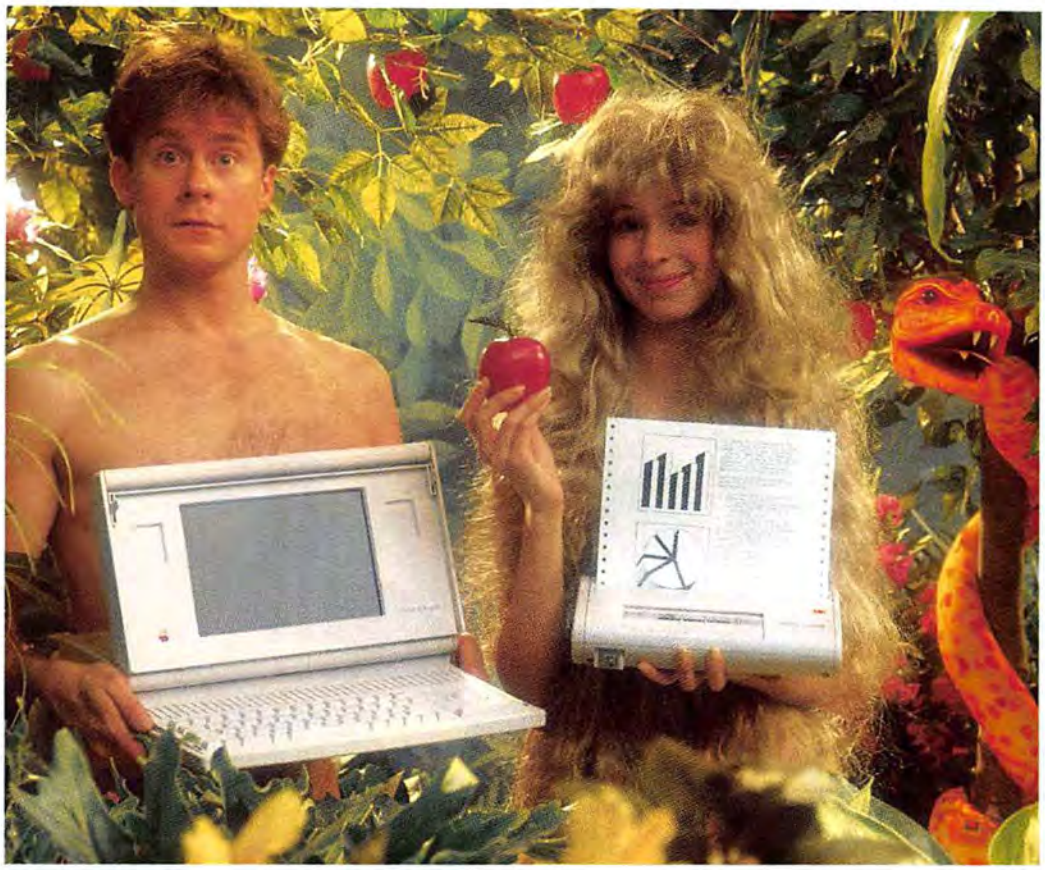


TSTimer, the DA portion of Timeslips III, opens to the last slip you worked on. Each time slip is assigned to a client, and the activity and consultant buttons access user-defined menus. The Client menu determines whether a slip will be for billable time or an expense.

Macintosh computer and new Kodak Diconix printer

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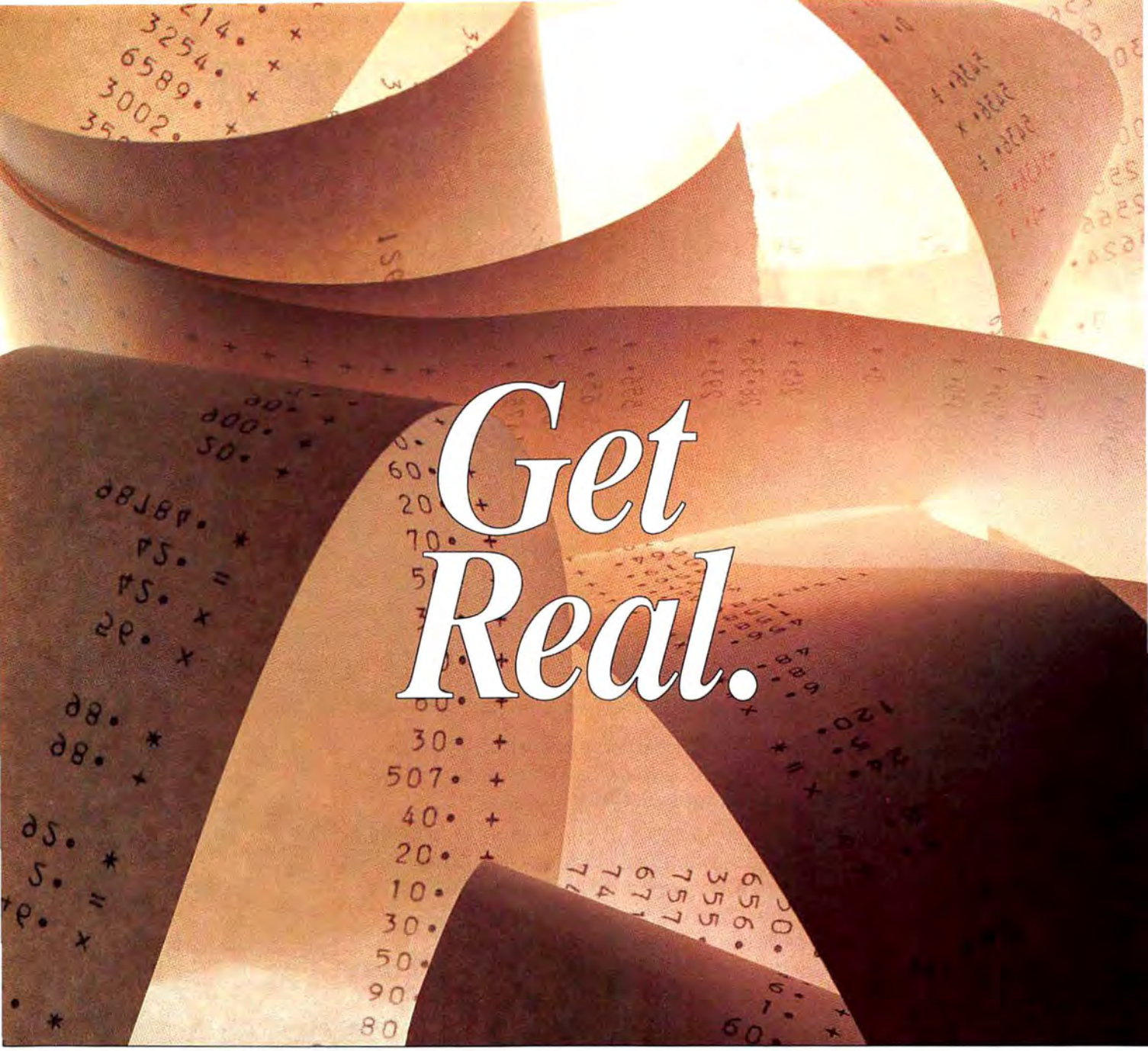
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And this is just the beginning. Add up all of Champion's features, and you have everything it takes to turn your Macintosh into a serious accounting tool. For the name of the Champion dealer nearest you, call **1-800-688-8666**. Dealer inquiries are also invited.

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slick as Timeslips. The DA doesn't automatically open to a time slip unless you designate a client file as the default file. The documentation is not quite as polished, and the process for correcting a time-slip mistake is not quite as simple. On the other hand, the step-by-step operation of TimeMinder reduces the likelihood of making serious mistakes. This alone will be the most important selling point for many buyers.

When you open TimeMinder, you can select a file for just one client, since the program issues only one bill per file. The file lists every job you have open for that particular client. To start the time, either in the DA or the application, you click on the status button, which then asks for the activity taking place and automatically applies that activity's hourly billing rate.

With the TimeMinder program, there is no chance of making a mistake on a time slip and botching another client's file. Switching between clients, however, requires opening multiple client-file windows.

Batch entry for hours and expenses is fast. You can either specify the exact hours you worked or enter the total hours for each session. Under the Other menu, select Insert Item. Each individual slip will copy the information from fields on the preceding slip if you press the tab key — a procedure somewhat simpler than using Timeslips' Clone command. Item slips with the same description and project are totaled rather than listed individually, but this will be corrected in an updated version of the program.

TimeMinder needs a touch more polish in the billing procedure. You can tell the program to bill every project in a client file or only the ones active that month. The resulting format is not completely what you see on-screen; you'll have to do more fine-tuning than is necessary on a Timeslips bill to get it to look the way you want.



TimeMinder's options allow you to customize the printed output to add billable items, adjust markups, and specify detail without moving to another part of the program. But the layout isn't exactly WYSIWYG.



Project Billing's most annoying interface quirk is the scroll bars in the Action Window. The "project," "employee," and "action" fields all require you to enter codes for the program to function properly. Rather than producing a menu when you click on a field, Project Billing activates a clumsy scroll bar.

Time Billing on a Budget

Before buying a commercial program, you can see if you have the discipline for doing time billing by using a shareware program. That way if you find you can't keep the time records necessary to stay in business, you can use the money you saved for a Chapter 11 lawyer — who *does* know how to bill for time.

It's no surprise that the best time-billing shareware program was designed by a lawyer. Time Logger 2.12, by Loftus E. Becker, Jr., is a DA that logs billable time in a tab-delimited text file readable by most database, spreadsheet, or word-processing programs.

For only $15, you get a disk, documentation, and a time-billing program that runs under MultiFinder or the Finder. What's more, you can try Time Logger for 30 days before you pay.

Version 2.12. Requires System 4.2 or higher, Mac 512K or later. $15. Loftus E. Becker, Jr., 41 Whitney St., Hartford, CT 06105; CompuServe: 76703,4054; GEnie: LOFTY.

Project Billing: Bring Money

Project Billing 1.57 by Satori Software shows its age. It does almost everything you want in just about the way you want it, but at a list price of $595 (down from a recent high of $695), it should be out lining up clients for you too.

Project Billing doesn't have a DA version with scaled-down functionality, a big oversight for a program this expensive. Without MultiFinder, keeping track of time with this program is cumbersome, and its clumsy interface doesn't help matters. Take opening a client file, for example: You have to assign a client code number to each project before you can go any further. Project Billing will only accept ten alphanumeric characters for a filename in the project window, though the Macintosh can easily handle filenames of up to 27 characters.

After the code is assigned, you don't have to fill everything in on cards linked to the first project card. The program does it for you. There is a field on the card for expense markup, but it works only for global markups. If your markups vary, you'll have to leave that field blank.

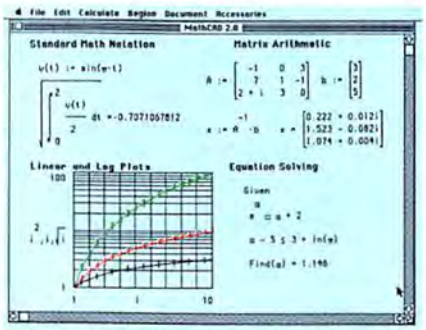
And woe be unto the person who uses both global and individual markups. Instead of letting the global markup override the individual markup, Project Billing combines the two markups. This results in invoices that will get your clients' attention, if

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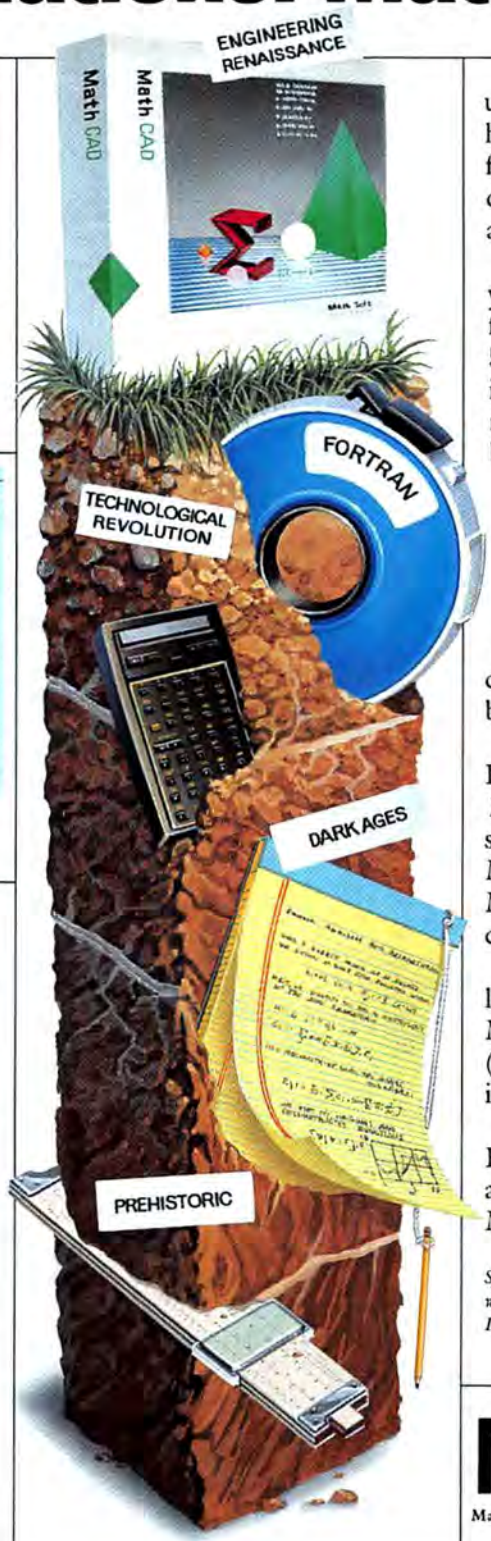


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ME

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#5

not their repeat business.

Here's an area where the Interface Police need to make a raid: When you're entering data for employees and actions into an action window — which is the equivalent of a time slip — Project Billing wants employee and action codes. Instead of a nice pop-up menu listing the codes, Satori has scroll bars that are touchy to use. Although you've shot past the code you wanted for the fifth time, at least you'll be able to bill for all the time you've wasted.

At least batch entry is easy. Each new action slip is based on the previous one, so you can just tab through a field if there is no change in it. Assigning tax rates is also a snap. You set a global tax rate and check "taxable" on the action slip on which you want to add tax.

Project Billing does just about everything you want, the way you want it done.

Project Billing does a very good job of managing client balances. If you are billing against an existing balance, the bill will reflect a grand total after all outstanding balances for each individual project have been deducted from the client's total balance. The total number indicates either a balance due or the credit remaining. The bill itself looks neat and professional.

In the Works

Both Timeslips and Aatrix are planning updates that will be available around the time this review is printed. The improvements and new features should eliminate the major drawbacks of the present versions of Timeslips and TimeMinder.

Timeslips III 2.0 is scheduled for March 1990. The new version's DA will open to a new slip instead of the last slip, cutting down on inadvertent

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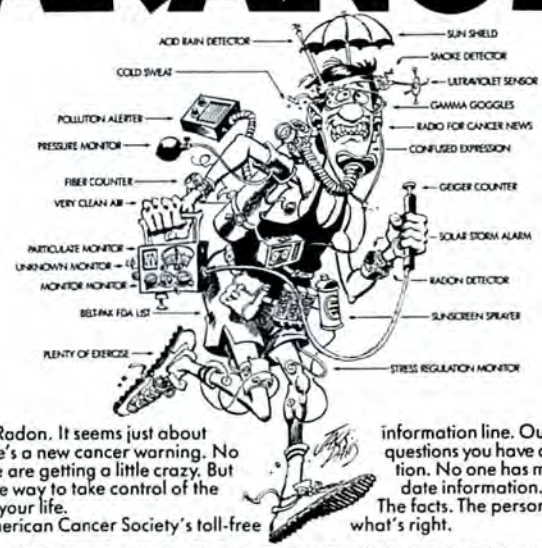
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COMMENTS FROM RECENT REVIEWS

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Macworld / *September 1988*

"**MultiLedger** is ideal for the small business. It's easy to set up and use and has an amazing set of accounting features when compared to other programs that cost more and don't offer much more power."
MACazine / *March 1989*

"I don't know of any other Mac accounting software which contains so many features and modules for the price."
Computers in Accounting / *January 1989*

"A welcome and impressive bonus is the **Payroll** program which can be linked to **MultiLedger**.... **MultiLedger** and **Payroll** are a bargain for companies that don't need a networked system."
MacUser / *April 1989*

"Our favorite package was **MultiLedger**.... it's the most elegant, usable and Mac-like of all the packages we reviewed.... CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."
The Macintosh Buyer's Guide / *Spring 1989*

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errors. There will be a more detailed Preferences window with ten key equivalents, a client-notes window that holds up to 2,000 characters, and a more detailed bill-layout editor.

In April 1990, Timeslips plans to offer a network version of Timeslips III 2.0 that will have added security features. The five-user network package will sell for $699.95, or $499.95 for those who already own the single-user version.

Aatrix is also working on a network version of TimeMinder, due in February 1990. The upgrade should clear up the invoice-layout problems I encountered. The new TimeMinder will allow all time slips from AppleTalk modes to be pooled and tracked. The network version will cost $299 ($75 for owners of the old version) for a master copy and $125 per node. The network won't require a file server. By upgrading its program while keeping the basic price the same, Aatrix has made TimeMinder a better value for the price.

Satori Software is also working on an improved time-billing package. According to the company, Time Billing will be available as part of the Components Accounting System. The new program will feature an improved interface, object-oriented accounting, customizable account-number formats, and report-publishing capability. Scheduled for March 1990, the Time Billing module will cost $595. The new module will not eliminate all the drawbacks, though. The program still needs a DA (Satori says there may be a smaller DA for temporary data entry) and a price cut.

(Two other time-billing packages — Rags to Riches Professional Billing by Chang Labs and Expert Time Billing from Insight — were not included in this overview because their features or support make them inappropriate for most users.)

Michael R. Shannon is the owner of MANDATE: Campaign Media, a Dallas-based political-consulting firm that prefers to be paid far in advance.

The Bottom Line

Focal Point II, $199.95, will work fine for free-lance writers or consultants who do a single project for a client and then vanish into the mist. But if you have ongoing relationships with clients, **Timeslips III** or **TimeMinder** is a better choice.

Of the four programs reviewed, Timeslips III has an edge simply because it offers more for the money. But even its price tag of $299.95 retail is a bit high, since 1.1h is more of an upgrade than a rewrite. In general, Timeslips is easy to use, has excellent documentation, prints polished bills, and comes with a DA.

TimeMinder, for $299, may help prevent billing errors for the Mac owner who is somewhat intimidated by the thought of accounting and is subject to many distractions. It is less polished than Timeslips III and has some minor bill-layout problems.

Both Timeslips III and TimeMinder offer 30 days' free support and a support package that you can subscribe to.

Project Billing manages client billing well, but simply costs too much. A $595 list price for a program with no DA and no provision for keeping track of time without MultiFinder is unjustifiable.

Report Cards

Focal Point II 1.01 ⧫⧫

A series of HyperCard stacks for office organization that contains a time-billing function. Compatible with HyperCard version 1.2.2.

Pros: Presentation is neat and clean, and the billing function comes as part of a good overall office-organization package.

Cons: Several projects for a single client cannot be consolidated into one bill. Batch entry is very difficult. Program requires unnecessary and annoying data entries, and the report format cannot be customized.

Requires: System 4.2 or higher and Mac Plus or later.

List Price: $199.95.

TENpointO, P.O. Box 3048, Menlo Park, CA 94025; (415) 329-7630.

Timeslips III 1.1h ⧫⧫⧫⧫½

This time-billing program comes as a separate application and DA. All clients are stored on slips in the same file.

Pros: Batch entry is easy. Almost all descriptions can be customized, and the program follows the Mac interface well. Documentation and on-line help are good.

Cons: The program opens to the last slip worked on, increasing the chance of error. (This problem is expected to be eliminated in version 2.0.)

Requires: System 4.2 or higher and Mac 512E or later.

List Price: $ 299.95.

Timeslips Corp., 239 Western Ave., Essex, MA 01929; (508) 768-6100.

TimeMinder 2.1.6 ⧫⧫⧫⧫

Like Timeslips, TimeMinder comes as a separate application and DA, but every client's time slips are stored in different files.

Pros: TimeMinder makes it harder to enter information on the wrong slip than Timeslips does. Batch entry is easy.

Cons: TimeMinder is not as polished as Timeslips. The DA doesn't open to a time slip unless a client's file is designated as the default file. The bill layout is not WYSIWYG.

Requires: System 4.2 or higher and Mac Plus or later.

List Price: $299.

Aatrix Software, P.O. Box 5359, Grand Forks, ND 58206; (701) 746-7202.

Project Billing 1.57 ⧫⧫½

Project Billing does just about everything a time-billing package should but nonetheless has several deficiencies. It is due for a major overhaul in the first quarter of 1990.

Pros: Project Billing manages client balances well, and the bill looks professional. Batch entry and assigning tax rates are easy.

Cons: Project Billing's interface is clumsy (but should be improved in the upcoming version). The bills' "action" descriptions are too limited. The program is expensive and has no DA.

Requires: System 4.2 or higher and Mac 512 or later.

List Price: $595.

Satori Software, 2815 Second Ave. #560, Seattle, WA 98121; (206) 443-0765.





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CD-ROM
Hit Parade



CD-ROM seems exciting, but can you get the titles you want? Here are some misses and hits from an emerging technology.

Sometimes revolutionary ideas take a while to catch on. Take CD-ROM technology. It's been around for several years, yet today most people still haven't even seen a CD-ROM player, let alone the software for it. Why?

There are several reasons. CD-ROM players are sluggish and expensive. Software is costly, often very specialized, and sometimes not as cost-efficient as the books it is intended to replace. Is an electronic dictionary, for instance, worth ten times more than its print counterpart? Watershed CD-ROM technology — low-priced and broadly useful — has yet to emerge.

As far as software goes, the existing CD-ROM titles may vary widely in quality, but they are all worthy attempts at employing a technology that may still become a dominant communications medium of our day.

By Timothy Onosko

PHOTOGRAPHY: WALTER JESS II

Graphically Speaking

Because graphics require so much memory, using CD-ROM discs is an excellent way to package them. Many of the following titles — including typefaces, clip art, and photographs — are examples of the way CD-ROM is being used in the publishing business.

Art Room 3.0

★★★★

Art Room is a compilation of Image Club's entire library of PostScript display typefaces and a huge collection of EPSF clip art (more than 2,800 images). Well organized, it includes 50 templates for page-layout programs, Font Juggler DA (instead of the Font/DA Mover), and the Art Room Retriever DA for searching through the disc by keyword as well as for previewing art.

Image Club's fonts include some clever new designs — about 100 faces and variations in all — and several folders of color graphics, all of which are compatible with major page-layout programs.

Pros: One of the most attractive and versatile graphic-arts CDs. More than 1,500 pages of art make it sufficient for many desktop-publishing jobs. Some of the best typefaces are available as Adobe Illustrator files, so characters can be colored, stretched, etc.

Cons: Search and Preview feature is fairly slow and clumsy to work with. Some clip-art pieces are pretty large and require a 2-megabyte machine in order to do any manipulation beyond simple placement in a layout.

Image Club
1802 11th St., Suite 5
S.E. Calgary, Alberta T3G 3G2
Canada
(403) 262-8008
$999



Art Room 3.0's clip-art collection includes a nicely rendered ladybug.

DarkRoom 1.0

★★★½

Image Club's DarkRoom offers 375 digitized gray-scale photographs that can be manipulated and pasted into desktop publications via any standard page-layout program that accepts TIFF files. If you want to do any serious retouching or manipulating, however, you'll need a program such as Image Studio.

The collection, from Toronto's Focus Stock, includes photos of people, business activities, scientific and medical images, scenic settings, and more. Images are generic — smiling families, silhouettes at sunset, and the like.



The DarkRoom 1.0 disc contains black-and-white photos, but color slides are available.

Pros: Provides variety of professionally done images for newsletters and other layouts. Photos can be used for any purpose, with proper credit. Color slides and a color catalog are available.

Cons: Files, digitized with a Barneyscan 35mm slide scanner, appear less distinct and have lower contrast than photos in the Comstock collection (see following review). Most shots are too large to be opened in Image Studio on a 1-megabyte machine.

Image Club
1802 11th St., Suite 5
S.E. Calgary, Alberta T3G 3G2
Canada
(403) 262-8008
$499

DeskTop Photography

★★★½

Comstock's DeskTop Photography contains 464 digitized gray-scale photographs suitable for use in desktop publications. PageMaker (or any other program that accepts TIFF) is fine for cropping, sizing, and setting halftone scales, but you need a more powerful application for serious manipulations. The photos are comparable to DarkRoom's in both quality and subject matter.

Pros: Varied collection useful for many purposes. Images sharper than DarkRoom images. Includes color catalog; color slides available for an additional fee. Comstock grants use rights for in-house publications such as company newsletters and comps.

Con: Advertising use requires a separate license.

Comstock, Inc.
30 Irving Place
New York, NY 10003
(212) 353-8600
Volume 1, $500; Volume 2 (business images only), $195

Exotica ROM

★★★

Exotica ROM is a collection of 107 female pin-ups by Olivia De Berardinis, whose unusual nudes have a cult following. Each illustration is furnished in four different formats: scanned gray scale, color, black-and-white TIFF, and MacPaint-compatible. There are a few public-domain graphics applications here too.

Pros: HyperCard stack makes browsing easy; "slideshow" application runs on a Macintosh II with color monitor.

Cons: Few desktop publications could use this art; use rights are unclear.

Educorp Computer Services
531 Stevens Ave., #B
Solana Beach, CA 92075
(619) 259-0255
$199



Theodora, Slave Empress, is one of the few files from Olivia De Berardinis' Exotica ROM that we could actually print in a family magazine.

LetterPress

★★★★

LetterPress offers fonts through Image Club's The Desktop Vending Machine. It works like this: Image Club furnishes a disc with several typefaces, chiefly of its own design, that are unlocked. Other typefaces and clip-art files on the disc are locked. You unlock the files by calling the company for the password — at $99 per volume of clip art and $25 per weight for families of fonts.

Pro: This method of selling software is a terrific way for a desktop-

The less time you spend creating effects like these, the better.

Now you can add new zip to any document — or try out special effects in a flash — with Smart Art.™ Each volume in the Smart Art library contains fifteen effects, so your text can cast a long shadow or wrap around a circle in seconds. Smart Art effects save a lot of time because they're ready to use in virtually any application. Yet it's easy to customize these pre-built libraries of graphic and type effects by changing the font, size, shading and much more.

How does it work? Smart Art is a desk accessory that cleverly uses the PostScript® in your laser printer to create special text, 2D and 3D effects on your Macintosh® screen. Once you're satisfied with the effect you've made, paste it into your drawing, word processing or desktop publishing program and output it with any Adobe® PostScript printer or other device. Of course, Smart Art works with any PostScript font, too.



The less money you spend creating effects like these, the better, too. That's why Smart Art's suggested retail price is only $149.95 a volume. New volumes are also available, so if you don't see the effect you need, call Emerald City Software at 1-800-223-0417, in CA 415-324-8080.



EMERALD CITY SOFTWARE

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publishing company or a typesetting service bureau to get going quickly, with relatively little expense.

Con: Typefaces in the reviewed version were Type 3 PostScript faces, which do not reproduce at small sizes as well as Adobe's encrypted Type 1 faces do.

Image Club
1802 11th St., Suite 5
S.E. Calgary, Alberta T3G 3G2
Canada
(403) 262-8008
Completely unlocked versions, $4,999;
limited-access version, $199

NEC Desktop Publishing System

As a set, these four discs are a complete desktop-publishing resource for a corporate publishing center or an independent studio.

NEC, Inc.
1255 Michael Drive
Woodale, IL 60191
(312) 860-9500

Clip Art 3-D

★★★★

NEC takes clip art to a new dimension with Clip Art 3-D. The solid-model digital images can be sized, rotated, edited, and relit at will.

The models — airplanes, architectural models, everyday objects, and 3-D fonts — can be saved in PICT, TIFF, and EPSF. Most come in full color.

Pro: A good library of objects.

Cons: Models can't be considered realistic, as no smoothing techniques are applied. Complexity of models slows operations down on a 68000 machine.

$399

Image Gallery

★★★½



The Image Gallery from NEC contains clip art for business and other publications.

Image Gallery is a thoughtfully assembled clip-art library from Metro ImageBase. The Gallery is a mixture of black-and-white EPSF files of line art and 300-dpi TIFF files. The art, divided into 20 categories, represents styles of many eras and artists. Some of the images, however, are downright ordinary — the kind you find in every suburban shopper's guide.

Pro: With almost 3,000 images, should fit almost all graphics needs.

Con: Some art is mundane and typical of conventional clip-art sources.

$399

Photo Gallery

★★★½

Photo Gallery is a collection of 1,501 gray-scale shots supplied as TIFF files from Uniphoto, a commercial supplier of stock photos. Photographs can be used without charge in newsletters, in-house company reports, mock-ups, and composites.

Pros: The selection is more complete and diverse than usual. Photos are not overly light or dark, so laser printers can be used with good results.

Cons: High license fee for magazine or newspaper use. Shots come in uniform size, a problem if large, full-page sizes are required.

$399

Type Gallery PS

★★★★½

At the heart of the NEC system is Type Gallery PS, which is practically the entire Adobe PostScript type library. Only one face (Kaufmann Script) seems to be missing. Type Gallery uses a pay-per-file unlocking scheme similar to that of LetterPress. The cost of unlocking these files ranges from $49 to $259, depending on the number of type styles within the type family. You can get the disc with all 470-plus typefaces unlocked, but that is a costly proposition.

Pros: Faces in Type Gallery PS are complete Adobe Type 1 (encrypted) fonts. Look spectacularly good in any printed size. Truly a precious resource.

Con: With the future of PostScript somewhat uncertain, a sizable investment in the entire type library is wise only for those committed to the PostScript standard.

$9,999

ProArt Trilogy 1

★★★

ProArt Trilogy 1 has over 350 Adobe Illustrator files (EPSF) of business, holiday, and sports art.

Pro: The PostScript art prints well.

Con: Collection is limited to very few topics.

Multi-Ad Services, Inc.
1720 W. Detweiller Drive
Peoria, IL 61615
(309) 692-1530
$375



ProArt Trilogy's Holiday folder includes pictures of adorable Easter bunnies.

Quick Art

★★★

The "big daddy" of the pack is Wayzata Technology's Quick Art, which is licensed from Wheeler Art, a vendor of traditional newspaper and ad clip art. The material ranges from toys and religious images to music, food, and cartoons.

Pros: Only Image Club's ArtRoom has more files than Quick Art. Disc can be conveniently browsed via a HyperCard stack. Lets you view TIFF images before importing them into a DTP program.

Con: Similar in quality to the clip art from any other publisher.

Wayzata Technology, Inc.
P.O. Box 225
Farmington, MN 55024
(800) 735-7321
(612) 460-8438
$249



Quick Art shows you an "index card folder" of topics.

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Just register at the MacUser booth (#1630) and pick up a game card*. Then tour the exhibits to complete the card which will make you eligible for the Mac Portable drawing. If your completed card is picked, you win!

Naturally there'll be dozens of other great prizes for participants to win. And everyone eligible for the drawing will receive a special gift from MacUser. See the back of your game card for complete details and a prize list.

You'll also get MacUser's own Expo Directory to help you quickly find the products most important to you.

So as long as you're at the Expo, why not make yourself a winner? Play MacUser's *Great Mac Portable Giveaway*. Win a prize. And who knows...along with all the latest computer information, you could walk away with the latest Mac computer.



*Game open to MacUser subscribers at least 18 years old.

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"The PCPC JETSTREAM is not only the fastest unit but also has excellent software that lets you backup all the hard discs on a network at any predetermined time." - MacWorld 12/89
***$5995 Factory Direct Price $4279**

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256 shades of gray, 5 mice! "Highest Price Performance leader." - MacUser 10/89
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105 MEG $1279



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CD-ROM Hit Parade

Seals in the Government Printing Office

★★★½

This unique clip-art disc contains more than 600 scanned images of official U.S. government seals, provided as 300-dpi TIFF files. The disc has everything from the Department of Agriculture's meat-grading-stamp designs to the Postal Service's Mr. Zip. There's a HyperCard stack for browsing and a Retouch function for manipulating and even altering official symbols.

Pros: Comes with same TIFF viewing software as Quick Art. Nifty collection that provides an endless resource for practical jokers.

Con: Most people would have no use for such a specialized disc.

Wayzata Technology, Inc.
P.O. Box 225
Farmington, MN 55024
(800) 735-7321
(612) 460-8438
$69.95



Public Domain

CD-ROM offers a way to conveniently archive public-domain programs from bulletin-board systems and user groups.

BCS PD-CD

★★★★½

The title of the Boston Computer Society's public-domain disc may be short, but the disc is long on excellence. The PD Navigator HyperCard stack, for instance, contains minireviews of the 1,700-plus programs in the BCS's public-domain library.

The disc contains such offerings as software written for and by health-care professionals; a Technical Library folder of tech information and programmers' aids; and Bonus, a grab bag of programs not otherwise distributed by the BCS.

Pro: Well-assembled disc contains more than the usual batch of public-domain programs.

Cons: Difficult to search and needs a more complete directory.

Boston Computer Society
Macintosh Users Group
48 Grove St.
Somerville, MA 02144
(617) 625-7080
$125

ClubMac, Volume 1, Number 3

★★★½

This electronic "magazine," the only one available by subscription, is probably the best organized of the public-domain CDs, as it is arranged like a BBS. It has excellent searching and browsing features via HyperCard, and clear instructions on creating floppy disk sets.



Like a BBS, ClubMac tells the size of a file and how long it will take to download. Graphics files, such as this one (entitled Bizarre), can be previewed before downloading.

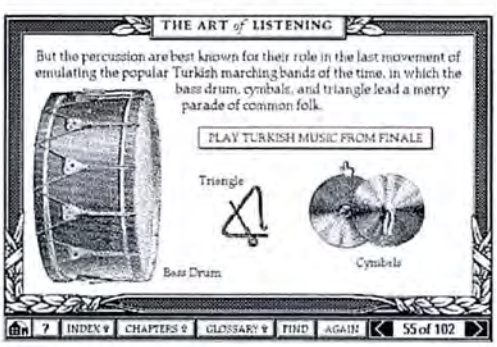
The disc has articles, classified ads, and an extensive list of U.S. and international Mac user groups, as well as a huge number of programs, including 596 DAs, 145 desktop-publishing files and templates, 818 HyperCard stacks, 1,470 graphics files, 385 game and

Interactive Music Appreciation — Voyager CD Companion Series: Beethoven's Ninth Symphony

★★★★★ This, the first in Voyager's CD Companion Series, is a brilliant multimedia experience that blurs the boundary between education and entertainment.

The core of the Beethoven's Ninth CD is a 2-megabyte HyperCard stack that explores Beethoven's world, uses the Ninth Symphony to illustrate what the author calls "the Art of Listening," provides a line-by-line commentary on the score of the Ninth, and includes a Beethoven's Ninth trivia game.

Accompanying the HyperCard stack is an audiodisc of Hans Schmidt-Isserstedt's 1966 recording of the Ninth Symphony. You can examine the 70-minute symphony note by note with full-fidelity examples from the disc.



This card from Voyager's CD Companion Series: Beethoven's Ninth Symphony explains a part of the symphony's finale that imitates a Turkish marching band. Users can hear the three instruments used to play in this part or click on the bar to hear the Turkish music itself.

The disc's greatest asset is its author. Robert Winter, a UCLA professor, uses enthusiasm and wit to explain musical ideas. This package alone is enough to justify a Mac CD-ROM listening station in every music library in the country. It's impossible to imagine a better way to explore Beethoven's greatest symphony.

Pros: Well-written, carefully designed, and thoroughly entertaining way to explore a musical landmark of Western civilization.

Cons: Real-time explications may be hard for slow readers to catch. Sound of HyperCard accessing hard disk may be distracting to users without headphones.

The Voyager Company
1351 Pacific Coast Highway
Santa Monica, CA 90401
(213) 394-2516
$99.95

— James Bradbury

leisure applications, and 731 music files.
Pro: Large, well-organized inventory of data and programs.
Con: Some of the large directories open slowly and tax the limits of the Finder.

Quantum Access, Inc.
1700 West Loop S., Suite 1460
Houston, TX 77027
(713) 622-3211
Single issue, $199; one-year subscription, $350

MegaROM 2.0

★★★½

MegaROM, an early public-domain collection, contains enough files to make even the most cursory look an exhausting one.
Pro: Superb source of large files too costly to download from an on-line system.
Con: The disc's only directory is a giant (240K) Microsoft Word file, making location of desired items difficult.

Quantum Leap Technologies, Inc.
314 Romano Ave.
Coral Gables, FL 33134
(800) 762-2877 (orders only)
(305) 446-2477
$49

PD-ROM 1.1

★★★★

BMUG (the Berkeley, California, Mac user group), which is one of the oldest user groups in the nation, offers a widely varied collection of material that is a genuine group effort. You sense the organization behind this product, from the comments in the HyperCard "navigation" stack to the contributions to the group's widely read newsletter.

PD-ROM has games, HyperCard stacks, graphics, DAs, fonts, sounds, utilities, a complete set of BMUG newsletters, and more than 17 megabytes of messages from on-line services such as Delphi.

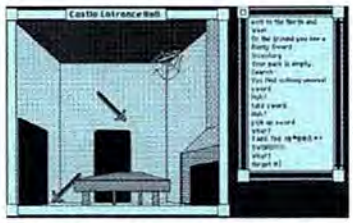
Version 2.0, containing 15,000 files (more than double the size of 1.1), should be out in January 1990. It will have a better user interface, will be indexed, and will take advantage of Discovery's search engine.
Pro: A good value, with logically organized material.
Cons: Some folders, mainly graphics and pictures, cannot open from the desktop except through HyperCard. MacWrite doesn't always work reliably from the CD.

Discovery Systems
7001 Discovery Blvd.
Dublin, OH 43017
(614) 761-2000
$100; 2.0 upgrade, $50

The Right Stuffed

★★★★

Quantum's The Right Stuffed crams extra data onto a CD-ROM disc because the files are "stuffed," or compressed, before mastering. The disc contains more than 80 megabytes of art files, 78 megs of sounds, 61 megs of demos, 44 megs of games, and more. Files are decompressed with StuffIt shareware, included on the disc.



The Right Stuffed contains a wealth of public-domain software, such as Castle of Ert, a quest game.

Pros: Contains an impressive 600-plus megabytes of data, including entire collection of Adobe screen fonts and entire 90-disk library from the National Apple User Group Conference of 1989. Files are public

Business Management — The Microsoft Office

★★★★½ The Microsoft Office on CD-ROM disc gives you Microsoft Word, Excel, Mail, and PowerPoint for one price: $949 — $100 more than the diskette version.

If you need both Word and Excel, The Microsoft Office is a good deal in either format. The CD-ROM version has the advantage of on-line HyperCard documentation. Considering the complexity of Microsoft's docs, it's nice to let HyperCard do the searching for a change.

CD-ROM purchasers of this package get goodies that diskette owners don't — a complete set of Adobe screen fonts, DocuComp, Excel templates, sample clip art for PowerPoint, QuickBasic, and demo or limited-use versions of other applications.

The disc is controlled by a HyperCard stack residing on your hard disk. You browse through the disc and download selected items to your hard disk. The one time the download failed for me, I was able to move the application myself from the Finder.

Kudos to Microsoft for its initiative in distributing application software on this medium.
Pros: Good deal for users who need both Word and Excel. Wide selection of offerings from third-party publishers. Innovative approach to electronic documentation.
Cons: All or nothing; you can't buy *just* Word or Excel. Too much space on the disc is devoted to advertising Microsoft products. No option of getting hard-copy manuals if desired. Doesn't work on 1-megabyte Macs.

Microsoft Corp.
16011 N.E. 36th Way,
Box 97017
Redmond, WA 98073-9717
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— James Bradbury



HyperCard gives users access to the four applications in The Microsoft Office — Word, Excel, Mail, and PowerPoint.

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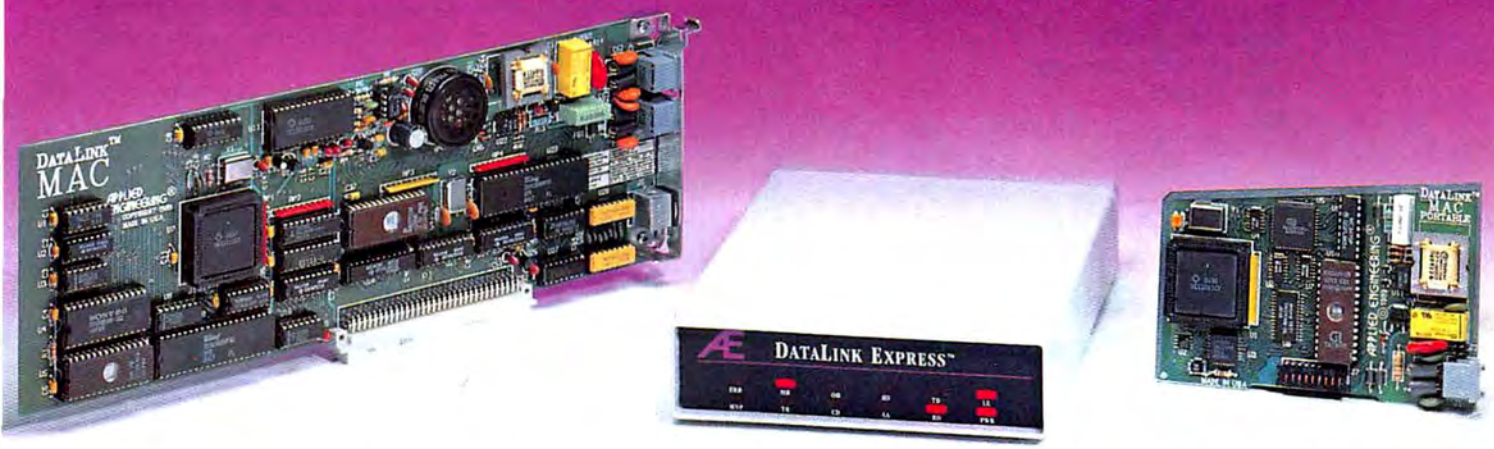
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DataLink/Mac™ (left), the ultimate internal modem for all Mac II's, includes a "Mac standard" serial port allowing for the addition of extra peripherals even when the built-in ports are occupied. Upgradeable to MNP-5 and send-fax.

DataLink Express™ (center), is a smart choice for compact Macs and for Mac II owners who prefer an external. Its exclusive Line Engaged indicator warns if the modem line is already in use. And since DataLink Express is compatible with any computer (w/serial port), we included both mini-8 and DB-25 ports standard. Options include MNP-5 and send fax.

DataLink/Mac Portable™(right) was designed for low power operation in the new Mac Portable to extend the life of the computer's battery. MNP-5 and send-fax are standard.

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domain except for the Adobe fonts and some demos. File format is compatible with bulletin-board systems' software programs.

Con: Disc lacks a convenient directory system, and "unstuffing" process of the files makes browsing more time-consuming.

Quantum Leap Technologies, Inc.
314 Romano Ave.
Coral Gables, FL 33134
(800) 762-2877 (orders only)
(305) 446-2477
$99



Referential Treatment

Reference books contain an enormous amount of material, but they also take up a lot of space. CD-ROM discs are ideal for mass storage of encyclopedias, telephone directories, fact books, and even catalogs.

Electronic Map Cabinet



This one's a clunker. Its title is most promising — a virtual cartographic department on a desktop. But promise and delivery are two different things.

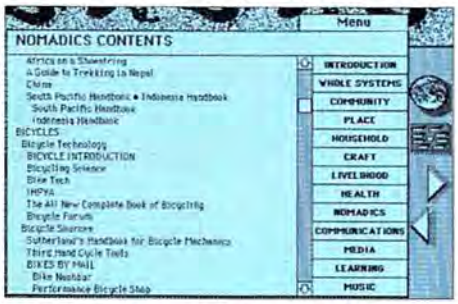
The purpose of the disc is to create maps from a database of nearly every metropolitan area in the U.S. If you live in a town of any appreciable size, chances are your street is on this disc.

Pro: Hefty, admirable job of data entry.

Cons: No labels on any maps. Can find street names by clicking on a road or highway, but process takes too long. Street labels don't tell anything else, such as the name of the next street over. Until these problems are rectified, stick with the paper variety.

Highlighted Data, Inc.
P.O. Box 17229
Washington Dulles International Airport
Washington, DC 20041
(703) 241-1180
$199.95

The Electronic Whole Earth Catalog



In the Nomadics domain, you can use the arrows to move between topics. A click on the earth takes you back to the main menu.



Of all the currently available CD-ROM discs, The Electronic Whole Earth Catalog comes closest to demonstrating a real vision of what the medium has going for it. This massive HyperCard stack (more than 9,000 cards) includes a broad range of subjects — community, household, media, health, music, and more. The catalog makes good use of HyperCard's ability to link cards by related ideas for easier and more fruitful browsing.

For those who are unfamiliar with creator Stewart Brand's concept, the Whole Earth Catalog is a catchall for practical information about tools, technology, and toys, as well as some trendy Northern California fluff. It remains to be seen if it stays current through frequent revisions or whether this is just a great demo disc.

Pros: Thorough, well organized, and well executed. Extremely browsable, unlike most big-data CDs.

Con: Slower than most because of multiple stacks and digitized audio.

Broderbund Software
17 Paul Drive
San Rafael, CA 94903-2101
(415) 492-3200
$149.95

Facts on File News Digest



Facts on File News Digest contains much more useful information than the Electronic Whole Earth Catalog, but it isn't nearly as creative in its approach. The information — Facts on File's newspaper- and magazine-article abstracts from the 1980s — is organized in three levels: You can search by keyword, browse through a person-and-topic list, or view maps.

Pro: Information is extremely valuable, although it covers only 1980 through 1988.

Cons: No hypertext feature, and index is hard to browse. The application used to access data on the disc, which resides on a hard disk or the supplied floppy, is skittish about running under MultiFinder. Conventional Finder on a Mac IIcx with lots of memory and System 6.03 ran fine; keyword search bombed a lot. Application didn't like a large video display and couldn't be resized. Information can be printed but not copied and pasted to other documents.

Facts on File
460 Park Ave. S.
New York, NY 10016
(212) 683-2244
$770

The National Directory





A search through The National Directory for reference books on mail-order businesses yielded two listings. Clicking on either one gives you the publisher's address and phone number.

Here's one of those technological dreams: A massive phone book on your personal computer. The National Directory is a kind of U.S. Yellow Pages of 115,000 organizations, including toll-free and fax numbers, and addresses. You can do a search of the directory based on any element of a company's name or address and then

More to Come

Worthy of mention but unavailable at press time, these products should be released by the time you read this.

Beyond Osmo

If you liked the Manhole and loved Cosmic Osmo (see Scrapbook, August '89), then you must get Beyond Osmo, Activision's second entertainment CD-ROM disc. Beyond Osmo is based on the Cosmic Osmo diskette game but promises twice as much — more characters, puzzles, and activities and four more worlds. You'll experiment in a chemistry lab (complete with explosion), play a video game, and select tapes to play on a radio. Beyond Osmo, with beautiful graphics and a full music soundtrack, will probably sell for around $70 and should be worth every penny!

Activision
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500

CD Audio Notes: The Magic Flute

Warner New Media combines CD audio and CD-ROM data in its interactive presentation of Mozart's *The Magic Flute*. This three-disc set is the first in the Audio Notes series. HyperCard "sidebars" cover the opera's plot, characters, musical terminology, and historical context and provide side-by-side German to English translations. Upcoming titles in the Audio Notes series, ranging from classical to jazz, should add a new dimension to music appreciation.

Warner New Media
3500 Olive Ave.
Burbank, CA 91505
(818) 955-6499

Datapro Consultant

The Datapro Consultant disc, to be published quarterly, features audiovisual critiques; product comparisons; specification tables; and ratings for desktop-publishing, word-processing, spreadsheet, and other applications. Aimed at business, government, education, and the arts, the disc will also cover music, CAD/CAM, multimedia applications, company profiles, background articles, and recent product announcements. It will be priced at $249 per issue, or $899 per year.

Datapro
600 Delran Parkway
Delran, NJ 08075
(800) 328-2776

Variety's Video Directory Plus

Movie buffs and video-store owners can keep up with the latest films for home viewing with Variety's Video Directory Plus. *Variety* magazine's show-biz coverage of the past 85 years is the source for the disc's 40,000-plus reviews. You can search for information in 19 ways, including by ratings, year, title, and keyword. The Video Directory Plus, to be released in the second quarter of 1990, will cost $395 per year, with quarterly updates.

Bowker Electronic Publishing
245 W. 17th St.
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(800) 323-3288
(212) 337-6989
— Laura Johnson

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Apple Portrait	829
Radius	CALL
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19" Color Trinitron	2599

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(or lease $165/mo.)	

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105 MB	(19 ms)	749
120 MB	(15 ms)	949
170 MB	(15 ms)	1149

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ColorBoard 108+/SE30	998
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6800 Westgate Blvd., Suite 139 Dept. 325, Austin, TX 78745

Prices subject to change (usually down). Although we are not an authorized Apple dealer, we will repair or replace any Apple equipment during the warranty. All merchandise is guaranteed new, unused, and covered by original manufacturer's warranty. 'Apple', 'Macintosh', 'Quantum', 'RasterOps', 'Radius' and 'Sony' are trademarks of their respective companies.

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create customized mailing lists and fax-modem directories based on your search criteria. By the way, a *real* national directory would be great. Theoretically, a CD-ROM disc could contain tens of millions of names, addresses, and phone numbers.

Pros: Obvious value of a national phone book; automated search capability gives the CD-ROM disc a great advantage over a printed book. Fax directory is especially appealing.

Cons: Still faster to look up numbers in a book. Tedious to move from card to card within the database; no cross-referencing (except via searches by category, name, town, and so on). Lets you create mailing lists but not enter additional data.

Xiphias
8758 Venice Blvd.
Los Angeles, CA 90034
(213) 841-2790
$195

The New Electronic Encyclopedia



This disc is not an ambitious project. It includes only the text and none of the illustrations of its paper counterpart, the *Academic American Encyclopedia*. Though the print version has a poor reputation, the disc version is useful for research that doesn't require in-depth analysis.

Pros: Useful, competitively priced product. Any word in encyclopedia can be searched. Searches are lightning-fast, since only index and not entire volume is searched. Runs under MultiFinder, so it's unnecessary to quit from an application to do research.

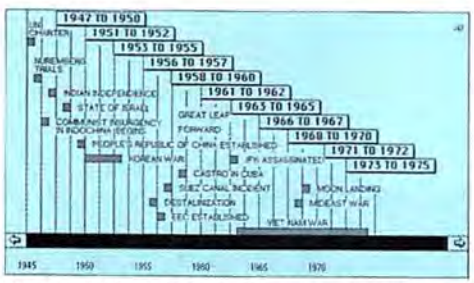
Cons: Only first 50 articles (listed in order of number of mentions) can be accessed. Hypertext feature moves to a reference in another article. Illustrations would add to its usefulness.

Grolier Electronic Publishing, Inc.
Old Sherman Turnpike
Danbury, CT 06816
(203) 797-3500
$399

Timetable of History: Science and Innovation

The developers of the Timetable of History have undertaken a huge task: cataloging and organizing the history of science and technology. Unfortunately, this disc promises more than it delivers.

The Timetable is a HyperCard system. Beginning 46 million years ago with the big bang, it extends all the way to 1988 and covers significant events in thought, religion, science and technology, government, the arts, and everyday life. All this information is conveyed in a 25-words-or-less shorthand text, which leaves quite a few gaps. For instance, a search for the word *fork* to find when that implement appeared as an eating tool yielded just two references to tuning forks.



The Timetable of History: Science and Innovation also covers world political events.

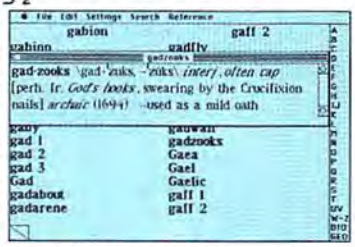
Pros: An ambitious, encyclopedic disc. The graphic timelines illustrate most-important events through 1988. Events are linked to maps showing where they took place.

Cons: Confusing layout. Many buttons, some nonfunctional, few labeled. Powerful search function allows Boolean (and/or) searches, but meager documentation doesn't explain its use. In review version (the first CD-ROM release), the Go To feature for directly accessing cards didn't work, leading to an endless loop requiring restarting. Both this disc and The National Directory (also from Xiphias) appear to have been rushed to market before being adequately tested.

Xiphias
8758 Venice Blvd.
Los Angeles, CA 90034
(213) 841-2790
$185

Webster's Ninth New Collegiate Dictionary 1.03

This is a potentially great idea that's not quite there yet: Webster's Ninth on a CD-ROM disc. Unlike word processors' spelling checkers, this disc contains everything the printed volume does, including pronunciations (digitally recorded), primary definitions and alternatives, illustrations, geographic place names, and a proper-name index. A large-type option increases the screen font to about 24 points.



The CD-ROM version of Webster's Ninth New Collegiate Dictionary gives word origin, definition, and pronunciation (both written and vocal). This is the large-print version.

What this product really needs is hypertextlike features such as those of Microlytics' Wordfinder Thesaurus DA. It would be better if it could run inside other word processors, replacing their limited dictionaries and spelling checkers.

Pros: Most complete dictionary for the Mac, and only one with pronunciation feature. Definitions and illustrations can be copied and pasted into other documents. Documentation slim but good. Shows enormous promise.

Cons: Version submitted for review required much more than the 770K recommended for use with MultiFinder; application used to access data on disc sometimes quit unexpectedly. Searches were somewhat slow; word-lists window had a notepad like "turned corner" instead of scroll bar. Illustrations could not be copied and pasted into other documents.

Highlighted Data, Inc.
P.O. Box 17229
Washington Dulles International Airport
Washington, DC 20041
(703) 241-1180
$199.95

The World Factbook

The World Factbook is a text-only database of geographic, political, and demographic information about 248 countries. The source is the *World Factbook*, published annually by the U.S. Central Intelligence Agency. There's lots of useful information about each country, covering disputes with other nations, maritime claims, land use, defense statistics, telecommunications policies, debt, literacy, labor force, and more.



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Offer ends June 30, 1990. Quantities are limited. Please allow 4 to 6 weeks for delivery.

Apple Computer, Inc.

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Pro: Much useful information.
Cons: Information difficult to access. Quick Search function is a meager solution to the problem of browsing through data. Viewable entries are limited to 50. Quick Search needs many, many more features. Information cannot be copied and pasted into other documents.

Wayzata Technology, Inc.
P.O. Box 225
Farmington, MN 55024
(800) 735-7321
(612) 460-8438
$99

Miscellaneous

The range of CD-ROM discs inevitably means that some can't be neatly categorized. Here are a few more noteworthy titles.

DeskTop Sounds, Volume 1

★★★½

This collection of almost 400 digitized sounds (each 1 to 3 seconds long) can be played within SoundStack, a HyperCard routine, or anywhere else standard sound documents can be played. Two megabytes of memory are recommended, but you can get it to work by stripping a Macintosh Plus of memory-hogging INITs, DAs, and the like.

Pro: Easy access to an enormous quantity of sounds that would be almost unmanageable on floppy disk.

Cons: Browsing the stack can be frustrating; can be searched only by title, keyword, or category (the documentation does list all the major category headings and classifications). Commercial, public-domain, and shareware use rights unclear.

Optical Media International
485 Alberto Way
Los Gatos, CA 95032
(408) 395-4332
$120



Each file in DeskTop Sounds is accompanied by a precise description of the sound, as well as its location on the disc and its length. In addition to animal noises, the disc includes typical human, mechanical, and natural sounds.

MacroMind CD-ROM

★★★

This is less a product than a great way to survey some of the best animation created with MacroMind's VideoWorks 2, a simplified 2-D MacPaint-like animation program.

Included on the disc are MacPaint files of clip art and examples of



"guided tours" that VideoWorks has created for clients such as Aldus and Microsoft to demonstrate their products. There are folders full of simple animation by kids and work by some of the most proficient VideoWorks artists. The short pieces assembled by Mike Saenz, creator of the MacPaint comic book *Shatter*, are the best of these.



"Shiva" is art from a VideoWorks sequence in MacroMind CD-ROM.

You need VideoWorks (sold separately) to manipulate, customize, or adapt the minimovies on this disc.

Only a few of the examples on this disc can run on a 1-megabyte Mac, and most require color. The animations created for color machines can't load into VideoWorks running on black-and-white machines.

Pro: Examples of the best of VideoWorks animation are valuable for VideoWorks novices.

Con: Not much new material for advanced VideoWorks users.

MacroMind, Inc.
410 Townsend, Suite 408
San Francisco, CA 98104
(415) 442-0200
$195

the Manhole

★★★½

The Manhole is a HyperCard adventure for children and adults based almost entirely on graphics and sound. The CD-ROM format allows players to wander through an *Alice in Wonderland*-like world. This exploration is the only object of the game — there's no winning or losing.



The rabbit invites you to have a cup of tea in the Manhole, a delightful interactive adventure for children and the young at heart.

The Manhole runs on a Mac Plus with 1 megabyte of memory, although the System file must be practically stripped clean of superfluous DAs, fonts, cdevs, and INITs in order for the digitized sound to play without interruption.

Pros: Gentle, pleasant fun. The music by Russell Lieblich and Ed Bogas — producer of the famous Studio Session music programs — is quite nice. All the music from the game follows actual data portion on disc and can be listened to separately.

Con: Kids past ten years of age will probably get bored fast. Adults with more patience may find this fascinating.

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The power requirements of the MPT-155 are low. It is designed so that it can safely use the battery of the Macintosh Portable.

MicroNet offers a wide range of Macintosh streaming tape backup systems and hard disk drives that are designed to fit the needs of the entry level user to that of a network manager.

Data sheets and the name of nearest dealer on request.

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CD-ROM Hit Parade

Activision
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500
$59.95

Media Mixer CD-ROM Developer's Lab

★★★½

This is not, as the name implies, a set of tools for building CD-ROM discs; rather it's a disc about creating a CD-ROM disc. It covers optical-media classifications and data conversion and assembly, and it includes public-domain demos and "trial size" versions of applications for creating discs. Despite claims that the disc contains many types of multimedia, there are few sounds and only 18 illustrations.

Pro: Good technical insights on creating a CD-ROM disc, including discs that work on multiple machines.

Cons: Shaky main-menu software for accessing disc features. Doesn't utilize the MultiFinder environment. Problems with resizing windows on large Mac video displays. One demo application didn't run at all. Microsoft's books about CD-ROM technology give excellent coverage for about half the price of this disc.

Software Mart, Inc.
4131 Spicewood Springs Road, #1 – 3
Austin, TX 78759
(512) 346-7887
$79.50

Phil and Dave's Excellent CD (Developer Helper)

★★★★½

This is Apple's demonstration of the practical value of CD-ROM. It is virtually Apple's entire library of utility and system software on a single disc, and it's available to developers only. The disc has developers' notes, editors, all the fixings for "guided tours," and any other tool that serious developers and amateur tinkerers could want. It also includes a program called Disk Maker that copies files while you wait. Tracks 2 through 8 contain Apple radio ads, new-age music, and old favorites (such as "Apple II Forever") from past trade shows and product introductions. This is a rough hacker-feeling project that's sure to become a legend in the Mac community and is a tribute to Apple's garage beginnings.

Pros: Comprehensive library of handy programs and utilities. Allows complete copies of all the system-software floppy disks (except the very earliest version of the System) that have ever been distributed.

Cons: Browsing through the disc is almost bewildering. Available to developers only.

Apple Computer
Developers' Services
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010
(408) 974-4897
Price: NA

Timothy Onosko writes about technology and popular culture.



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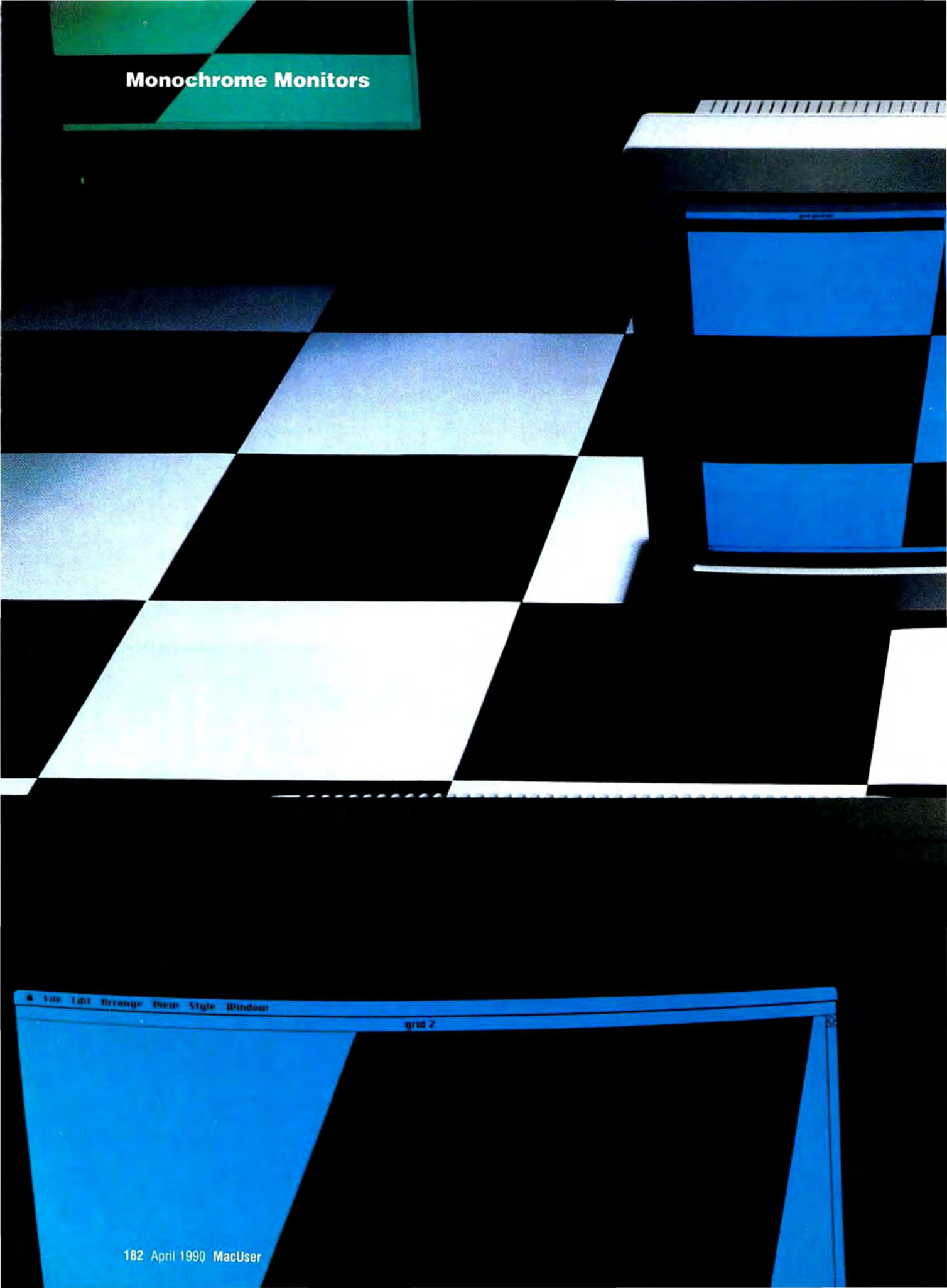
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*Steve Costa, *MacWEEK*, 10/3/89. **MacUser 1989: Editor's Choice, 5 Mice Rating, and Eddy Award for Best Utility. Macworld's 1989 Reader's World Class Award. Publish!'s 1989 Reader's Choice Award. Best seller through National Distributors: Ingram Micro D, Softsel, Kenfil. SUM is a trademark of Symantec Corporation.
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Monochrome Monitors





MacUSER LABS

A Study in Black and White

Which monochrome display system is the clear choice? MacUser Labs gives you the answer in black and white.

The original Mac display had a lot in common with Henry Ford's Model T. It was simple and revolutionary and came in any color you wanted, as long as you wanted black — and white. Ford's tiny Ts have since evolved into lumbering herds of multicolored Tauruses. Mac displays have proliferated as well. Today, offices overflow with a multitude of color, gray-scale, and monochrome monitors. If you're choosing a display system — a monitor and the video card needed to drive it — the options can be overwhelming.

But don't worry, MacUser Labs is here to help. In October 1989, we gave you the lowdown on 11 gray-scale display systems. Next month, we'll announce the picks and pans of color systems. In this report, we evaluate the full range of monochrome options, from the familiar 9-inch classic Mac display to the 24-inch Moniterm Viking 2400 megamonitor. We put 19 display systems through our rigorous suite of tests to help you decide how best to spend your monochrome dollar. In addition to doing objective instrument testing, we also sat a jury of experienced screen-starers in front of each monitor

By Rik Myslewski and the MacUser Labs staff

and asked their opinions of its focus, geometry, and "nuisance factors" — flicker, jitter, glare, ghosting, noise, and irregularities in the screen's whiteness and brightness.

Color is seductive, and gray is great. But when you take a long, hard look at your needs — and your wallet — you may find that the choice is as simple as black and white. The Big Three applications that created the desktop-computer market — word-processing, spreadsheet, and database-management programs — work just fine in a monochrome world. Most desktop-publishing needs are also met in black-and-white, although if you're working on a full-color publication like *MacUser*, life's much easier with a color monitor.

But most of us aren't artists or designers whose work demands color. A high-quality two-page monochrome display system costs around $2,000 — less than half of what you'd pay for comparable

The Orphans

We've limited the scope of this month's lab report to display systems — pairs of monitors and video cards from the same manufacturer — but monitors and cards are also available separately from other vendors. These so-called orphans are often less expensive, but mixing and matching them can be tricky.

The trick to selecting an orphan card is making sure that it can generate the appropriate video signals to drive the monitor you're interested in buying. This requires matching the horizontal and vertical scan rates. Monitors and cards don't always perfectly meet their own specifications, so it's best if the card has been optimized for a particular display, which prevents a scrunched picture with wide black borders. Since the quality of the monitor is the most important factor in display performance, first choose a monitor you're interested in, and then try to find a compatible card. Here's a peek at some video cards currently up for adoption.



The RasterOps ClearVue SE/APD ($795) combines an accelerator with video circuitry compatible with the top-rated Apple Portrait Display. This card has all the features of the ClearVue/SE, including a 16-megahertz 68000 processor, optional 68881 math coprocessor ($395), pop-up menus, inverse video, large cursor, screen saver, zoom display, and dual-screen video capability. For optimum acceleration, your SE's RAM and ROM can be placed on the ClearVue board; RasterOps provides two SIMMs for placement on the SE motherboard to retain normal sound and video capability. RasterOps, 2500 Walsh Ave., Santa Clara, CA 95051; (800) 468-7600 or (408) 562-4200.

The Publisher series of video cards ($525 each) for the Mac SE, SE/30, and II family is optimized for Apple's Portrait Display and Two-Page Monochrome monitors, plus two 19-inch monitors, Sampo's OfficePro II and Ikegami's DM2010A. An optional ($25) complement of large-screen enhancement software includes pop-up menus, a screen saver, and a large menu bar and cursor. The SE and SE/30 cards allow for dual-screen operation. Generation X Technologies, 333 W. El Camino Real, Suite 310, Sunnyvale, CA 94088; (800) 448-8231 or (408) 739-4570.

The MultiScreen SE ($395) is a monochrome video card for the Mac SE that's optimized for Apple's Portrait Display and High-Resolution Monochrome monitors as well as almost 20 other displays. It's bundled with a collection of large-screen utilities, including pop-up menus, a screen saver, and roaming zoom features. True to its name, the MultiScreen SE allows for dual-screen operation. And with an optional slot expander ($89), you can add still another SE board such as an accelerator. Mobius Technologies, 6020 Adeline St., Oakland, CA 94608; (800) 669-0566 or (415) 654-0556.

The DisplayServer SE video card ($449) can drive the Apple High-Resolution Monochrome Monitor as well as PC-compatible TTL displays. An optional board ($79) allows for output directly to video devices such as a television or VCR. A NuBus version of DisplayServer ($499) for the Mac II should be out by now. Lapis Technologies, 1210 Marina Village Parkway, Suite 100, Alameda, CA 94501; (415) 748-1600.

Nemonix offers two video cards for the Mac SE that work with a variety of monitors. The NXMAC-VSE ($495) can be configured for portrait monitors from Apple or Samsung, or for two-page monitors from Apple, Taxan, Sampo, RasterOps, Ikegami, or Image Systems. Software features include dual-screen video, zoom display, large cursor, inverse video, pop-up menus, and a screen saver. Add an accelerator to this video capability, and you have the NXMAC-VXSE. The $1,070 version contains a 16-megahertz 68020 processor; tack on a 68881 math coprocessor, and the price rises to $1,320. Nemonix, 106 South St., Hopkinton, MA 01748; (800) 435-8650 or (508) 435-9087.

There are plenty of unattached monitors for sale, but most are designed for the PC market, in which, without a graphical user interface that demands quality geometry and focus, most manufacturers produce basic units with a surefire selling point: low price. Some PC-compatible monitors work with the Lapis and Mobius cards mentioned here, but many suffer from poor performance and low resolution.

If you need a display at a rock-bottom price, two promising 14-inch monitors are the NEC MultiSync GS2A ($349) and the Princeton MAX-15 ($389). Both require special Mac II cables (around $20), and both are compatible with Apple's Mac II 1-bit video card ($199) as well as the Lapis and Mobius boards. NEC Technologies, 1255 Michael Drive, Wood Dale, IL 60191; (800) 826-2255 or (708) 860-9500. Princeton Graphic Systems, 1100 Northmeadow Parkway, Suite 150, Roswell, GA 30076; (800) 221-1490 or (404) 664-1010.

— Owen W. Linzmayer and Jeff Pittelkau

color, and a thousand dollars less than quality gray scale. You can pay more for monochrome, but you can also pay much less. Some economy big-screen systems now slide under the $1,000 barrier. But remember, there's more than a little truth to the old adage "You get what you pay for."

Monitoring the Monitors

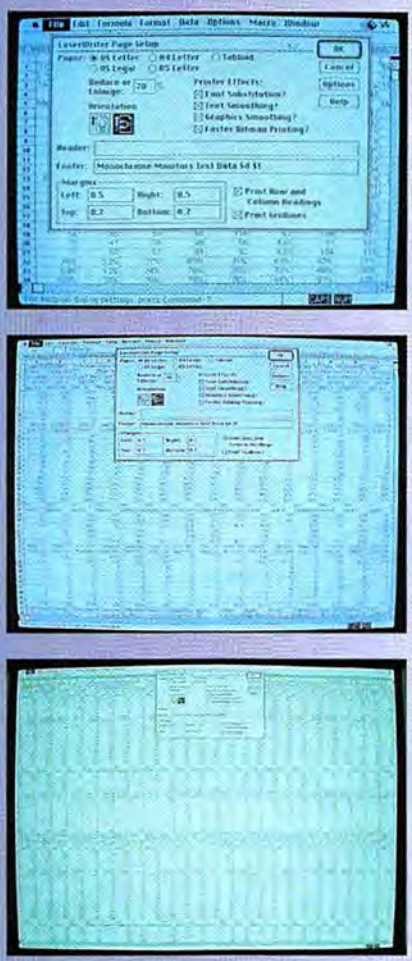
Price is not the only difference among monochrome display systems. Monitors differ in size, shape, resolution, brightness, focus, depth of black, and warmth of white. MacUser Labs has been dissecting monitors for years, and we've perfected benchmarks that measure these traits. In fact, we'd previously tested a dozen of the monitors we chose for this report. Five were reviewed in our first look at monochrome, in August '88, and seven were tested as bundled with gray-scale video cards in October '89. If you've saved your back issues (doesn't everybody?), you'll notice that we've changed our opinion of some display systems. Some manufacturers have improved their products, and a few monitors that were great in their day are now moseying toward retirement.

We performed all our tests on complete display systems, for two reasons. First, although they are sold separately in many cases (see the "Orphans" sidebar), video cards and monitors for the Mac are most commonly bundled together. When you buy a complete system, you get the necessary cables (and, in most cases, software) and the assurance that the card and monitor will work together. Second, features are embodied in both components, so there is no way to accurately review monitors or cards independently of each other.

Before you read on and become too enamored of the features and performance of any one monitor, take a moment to look at Table 1 to find what display systems are available for your Mac. If you're a Mac II owner, you're in luck: All 19 display systems are available with NuBus video cards. If you have an SE, your choices shrink to 16 — and installation becomes much more difficult. SE/30 owners can choose from 12 systems, but only half a dozen options are open to owners of the venerable Plus.

The results of our 600 hours of testing will help you become a more finicky consumer (see the "Troubleshooting Guide" sidebar). This report will arm you with facts that will impress and intimidate any high-pressure salesperson, but we can't tell you which monochrome display system is the absolute *best* for you. A monitor that seems rock-solid to one pair of eyes may be impossibly jittery to another. You might find the creamy white of the Micro Display MacGenius restful, whereas a coworker may prefer the SE's bluish screen. We will tell you how well each display system fared in our tests, however, and we'll recommend the ones that we judge best.

Figure 1: A Question of Resolution



The higher a monitor's resolution, the more information it can show. We displayed the same Excel spreadsheet and dialog box on three monitors with different dot-per-inch settings. The E-Machines QuickView Z21, at 36 dpi (top), displays only a few cells of the spreadsheet, but it's easily readable for presentations and group training. The RasterOps ClearVue, at 72 dpi (center), shows the spreadsheet at true WYSIWYG print size. When set at 120 dpi, the Sigma Designs L-View (bottom) displays an enormous number of cells, but be prepared to squint to make out the tiny type.

Weighing the Options

Before you ask some hapless salesperson to lug a dozen of these 40-pound behemoths from the back room for a side-by-side comparison, make a few preliminary decisions. Determine what screen size you want (all monitor screens are measured diagonally). Consider your applications. If you work with big spreadsheets, you'll probably want a large screen with a landscape orientation (that is, the screen is wider than it is tall). On the other hand, if you do a lot of word processing and occasional DTP work, a portrait display (which is taller than wide) may be better for you. In general, the bigger the screen, the more information you can display and the more you will pay.

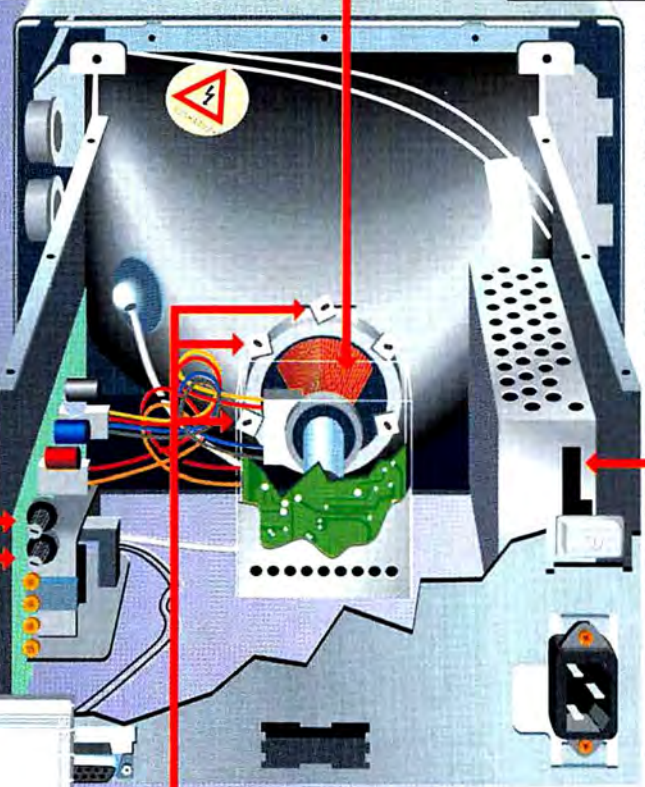
Apple has a stranglehold on the small end of the market. Its 12-inch High-Resolution Monochrome display system easily accommodates the full width and more than half the length of a letter-sized page. The competition heats up a bit at the 15-inch-portrait-monitor level, with the Apple Portrait Display joined by the Micro

Troubleshooting Guide



Fuzzy screen
Symptom: Your monitor is less sharp than one you saw in a store or an old monitor has become fuzzy.
Cause: Misadjusted focus controls or aging electronic components.
Solution: If the focus controls are outside the case, adjust them while the monitor is on, using a *plastic* adjustment tool. If the controls are inside the case, take the monitor to a service center for adjustment.

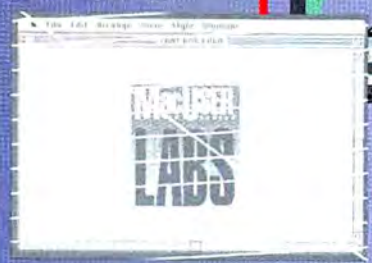


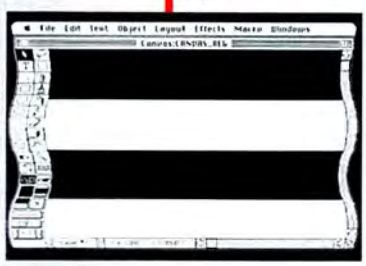


Rotated screen
Symptom: Screen noticeably rotated.
Cause: Monitors are generally adjusted facing east, and the screen will tilt slightly if it is facing in another direction. If the problem is severe, the clamp holding the yoke in place may be loose.
Solution: Point the screen east. If the image is still noticeably rotated, take the monitor to an authorized service center for yoke repositioning.

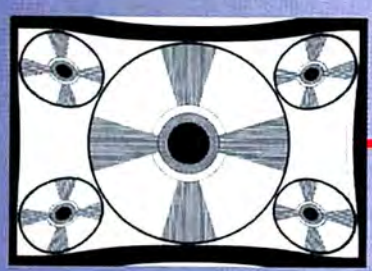
Visible raster
Symptom: Overall screen contrast is low. Blacks are gray, and diagonal lines may be superimposed on the screen image.
Cause: The brightness control may be set too high, or the sub-brightness control may need adjustment.
Solution: If reducing the brightness doesn't produce the desired result — a black background without raster lines — the sub-brightness control needs adjustment. If this control is outside the case, tweak it with a *plastic* adjustment tool. Do this by first raising the brightness and contrast to the maximum and then adjusting the sub-brightness so that the raster lines disappear and the screen background appears black. If the control is inside the case, take the monitor to a service center for adjustment.

Poor voltage regulation
Symptom: The visible portion of the screen expands when displaying white and shrinks for black.
Cause: Poor design or a faulty component may prevent the power supply from providing stable power to the CRT as the screen brightness changes.
Solution: If the monitor is new, return it for an exchange. If it's older, the power supply needs repair or replacement, a task for authorized service centers only.





Poor geometry
Symptom: Screen image looks irregular — scrunched in, puckered out, or wavy.
Cause: Alignment magnets attached to the yoke assembly have shifted, or a strong magnetic field is creating interference. Telephone handsets, motors, stereo speakers, and steel office furniture are all sources of magnetic fields.
Solution: Move magnetic objects away from the monitor. If the monitor is on a steel desk, demagnetize the desk by using a degaussing coil or move your system to another desk. If the screen still looks awful, the internal magnets may need realignment by a technician.



MARK W. SINCLAIR

Display MacGenius, Radius Full Page Display, and Sigma Designs PageView. Each of these portrait monitors can depict an 8.5-x-11-inch page at full size.

If you're really into desktop publishing or CAD, you probably want to display two pages side by side or a single B-size drawing at a true 1:1 scale. For that you need a 19-inch model, and here the competition gets heated, with nine manufacturers vying for your checkbook. E-Machines' The Big Picture also manages to squeeze two full pages onto a 17-inch monitor, but only by displaying the image at less than true 1:1 scale (more on this later).

Although 19-inch monitors may seem huge if you were raised on a Plus or SE, in this report we classify them as "medium," because we also found four monitors that are truly LARGE. We examined three 21-inch monitors: the Apple Two-Page Monochrome, E-Machines QuickView Z21, and Sigma Designs SilverView. Last — though certainly far from least — we tested the 24-inch Moniterm Viking 2400, which has more than 240 square inches of usable display. Compare these wide-open spaces with the 30 square inches of the standard 9-inch compact-Mac screen, and you quickly see the advantages of a big screen. When displaying standard-size Excel cells, a 9-inch screen shows only a tenth of the thousand-cell army that can occupy the Viking 2400. If you do a lot of complex financial modeling and hate scrolling, a large monitor is a must.

Don't assume, however, that a 21-inch monitor has a 21-inch display. Screen size is like mile-per-gallon ratings for new automobiles — you never get what the manufacturer claims. As with television sets, monitor screen size is typically given as the diagonal measurement of the CRT (cathode-ray tube) as it comes from the factory, but because some of the screen is hidden by the monitor's frame (or *bezel*), the exposed area is smaller. The active area (*raster image*) is smaller still and varies from one monitor to another. For example, the Apple Two-Page Monochrome and Sigma Designs SilverView are both rated at 21 inches, but the SilverView's active screen is more than an inch larger than the Apple monitor's 18.8 inches (see Table 1).

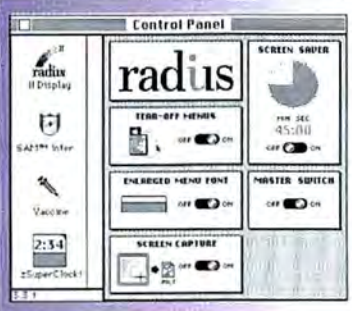
You also might want to compare the monitors' "whites" — that is, the color of the chemical phosphor on the inside surface of the picture tube. A carefully aimed stream of electrons strikes the phosphor, exciting it to give off the light you see. Phosphors vary in the color they emit, and people vary in the color they see. To avoid subjectivity in our color analysis, we tested each monitor with a Minolta TV Color-Analyzer II to determine its true color rating.

A "warm" phosphor, such as that used by Micro Display Systems in the MacGenius, gives off a reddish-yellow light that closely matches the color of paper. A "cool" phosphor — the SE and Plus are about as cool as you can get — has a blue tint. E-Machines' The Big Picture has an unpleasant greenish tint reminiscent of an old television set's. On most monitors, cool or warm, the color was the same over the entire screen, but the Nutmeg 19" Mono Display and Taxan Crystal View were marred by faint yellow blotches.

Resolution Confusion

After you decide what size and shape you want your monitor to be, your next decision should concern *resolution*. If this concept is a bit vague to you, you're not alone — even monitor manufacturers have trouble. Two parameters — *pixel dimensions* and *dpi* (dots per inch) — are often used interchangeably to describe monitor resolution. Simply put, pixel dimensions are the height and width of

Figure 2: Under Control



Radius offers excellent software to help you take full advantage of your Full Page or Two Page Display. The Mac II version provides an enlarged menu font, screen-saver and screen-capture utilities, and tear-off menus that you can position anywhere — including onto the screen of another monitor.



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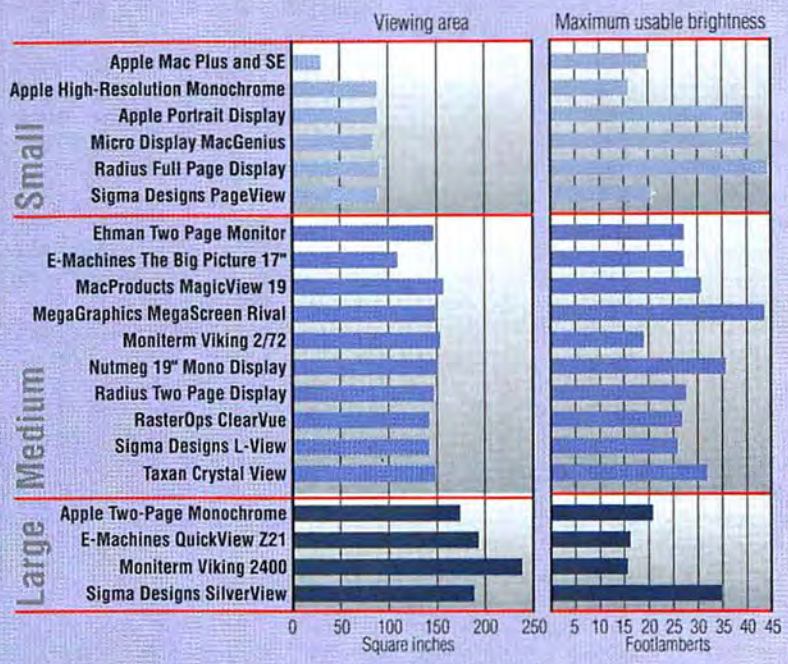
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Figure 3: Test Results

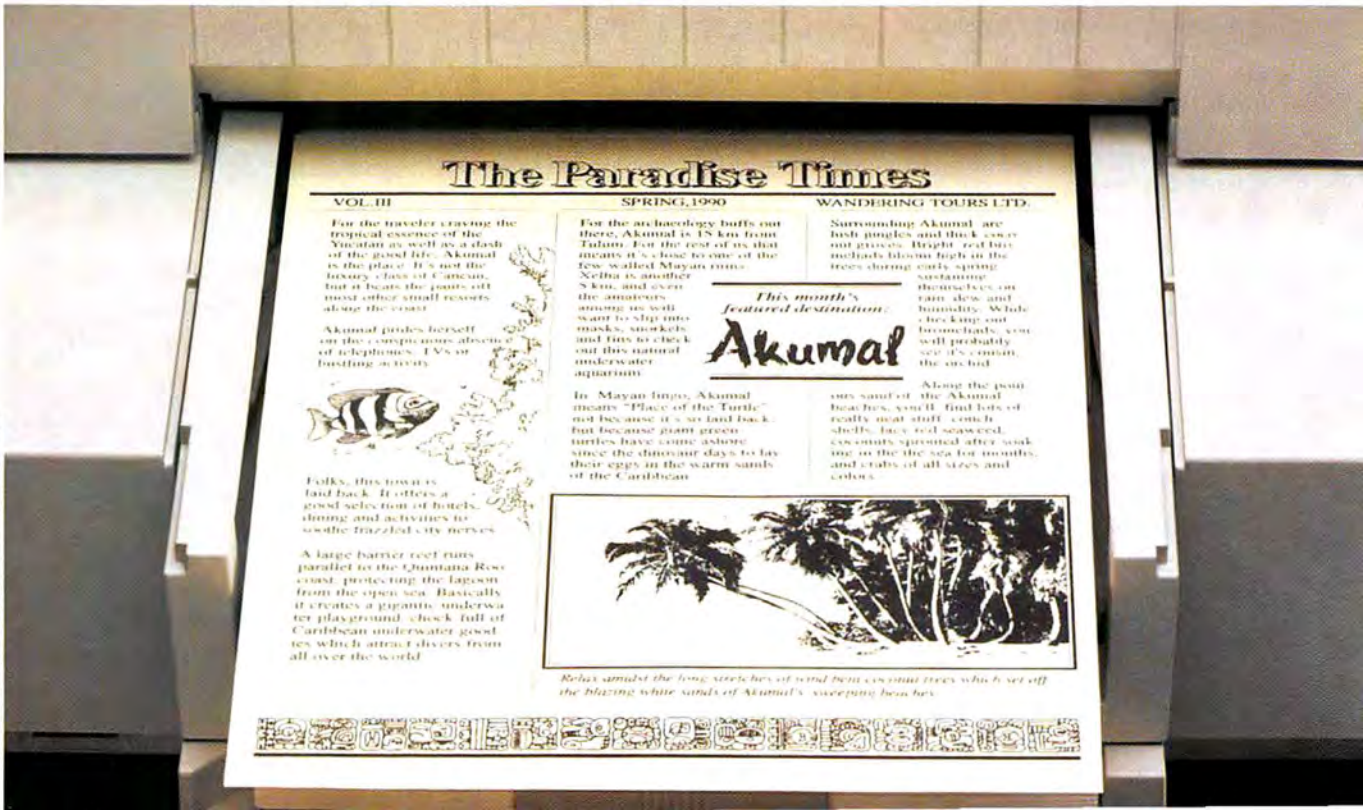
Objective tests: *Viewing area* is the actual size of the screen display in square inches. *Maximum usable brightness* is the brightest screen image, in footlamberts (fL), that can be obtained while maintaining a focused image. Under average indoor lighting conditions, most users will set their monitors to between 15 and 20 fL. *MTF sharpness* measures the contrast between adjacent one-pixel-wide lines. We averaged horizontal and vertical MTF ratings taken at the center and corners of each monitor.

Subjective tests: Our jury graded each display system on a scale of 1 (worst) to 5 (best). For *focus*, a monitor was judged on its ability to maintain a sharp image over the entire screen. The *geometry* score shows how well a monitor avoided bowing, pincushioning, and distorting circles and squares. Finally, we rated the display systems on their resistance to common *nuisances:* glare, flicker, jitter, noise, and ghosting.

(For all tests, higher scores [longer bars] are better.)

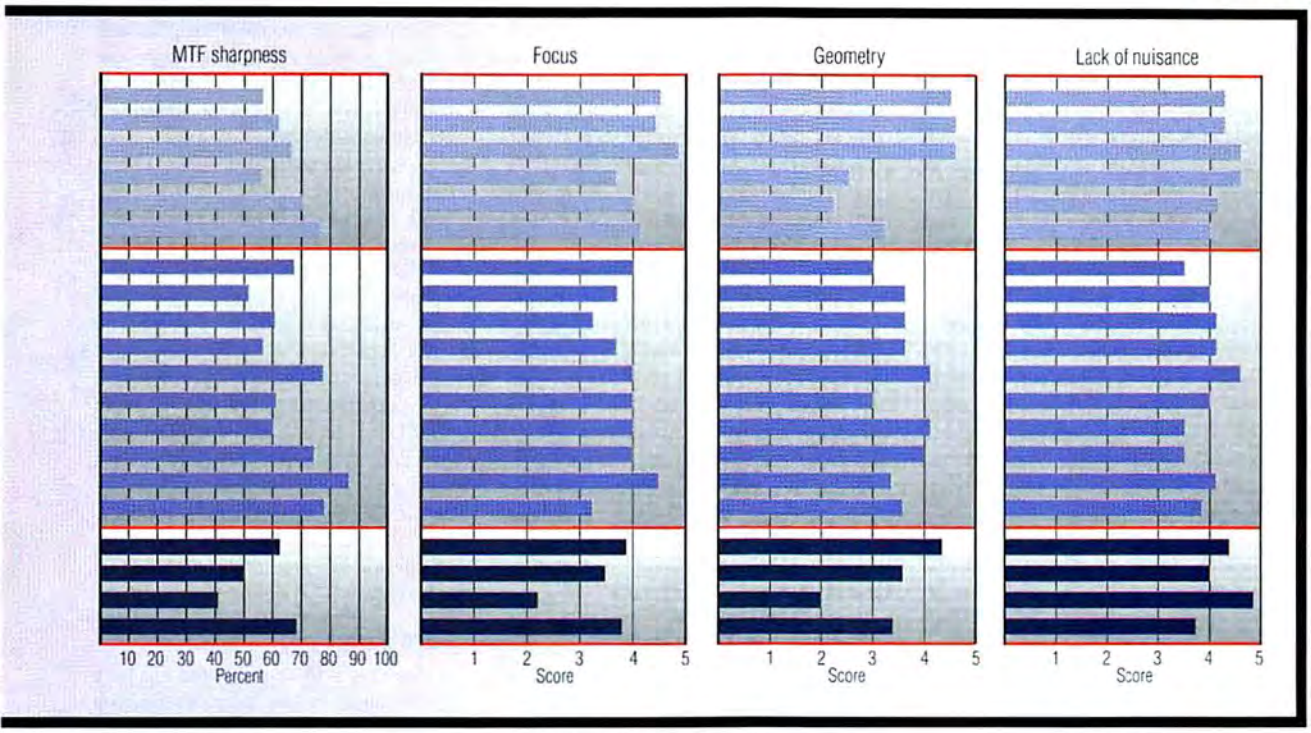


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the screen as measured in pixels (picture elements), and dpi tells how tightly those pixels (also known as dots) are packed together.

Pixel dimensions tell you the total number of pixels you can see on screen at one time. A monitor's horizontal dimension is given in pixels, and its vertical dimension is in lines of pixels. Given two monitors with the same number of dots per inch, the one with the greater pixel dimensions can display more information — a few extra rows and columns of a spreadsheet, for example. But the really valuable information — to your applications as well as to your eyesight — is how many of these little dots are packed into each inch. Therefore, we'll refer to resolution only in terms of dpi.

One of the Mac's fundamental design philosophies is WYSIWYG ("what you see is what you get"). In other words, when you print a document, it closely approximates what you see on-screen; a one-inch-tall screen object prints at exactly the same size. QuickDraw (the drawing routines built in to the Mac's ROM) simulates measurement standards common in the publishing industry. In printing, an inch equals 72 *points;* to achieve WYSIWYG, QuickDraw assumes that an inch on a monitor equals 72 pixels. Only monitors with 72-dpi resolution — such as the standard 9-inch Plus or SE screen, or a dozen of the monitors we tested — maintain a one-to-one size relationship between screen and printed page.

We tested monitors with both higher and lower resolutions than this standard. Documents displayed on screens with resolutions greater than 72 dpi appear shrunken. Unless high-resolution monitors have excellent focus, text can be difficult to read. On the other hand, displays with lower resolutions appear magnified. But no matter how tiny or huge something appears on-screen, QuickDraw prints it at 72 dpi.

True 72-dpi WYSIWYG is important in desktop publishing, where you need to see on-screen precisely what the printed document will look like. Monitors with lower resolutions are great for presentations and training, when several people are straining to read the same display. Low resolution can also be simulated with software that magnifies the screen image; seven manufacturers offer a magnification option.

High-resolution monitors can display far more information than a true WYSIWYG monitor can (see Figure 1). On a single 120-dpi screen, for example, the 19-inch Sigma Designs L-View can display 1,764 standard-size Excel cells, or most of this lab report in 12-point type. Just be prepared to squint, since 12-point type at 120 dpi is only 60 percent as large as at 72 dpi. If you'd like to have several resolution options at your fingertips, consider the E-Machines QuickView Z21. It has a large viewing area and easily alterable resolution settings of 36, 40, 72, and 80 dpi.

Card Games

Video cards differ in almost as many ways as monitors do. For example, you

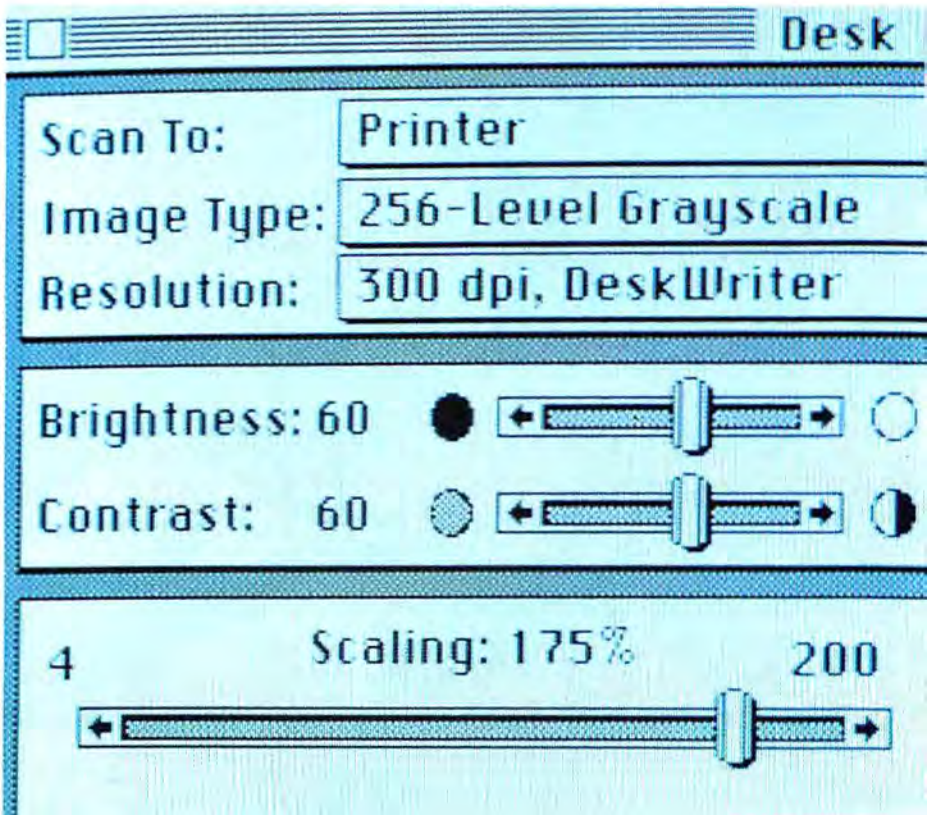
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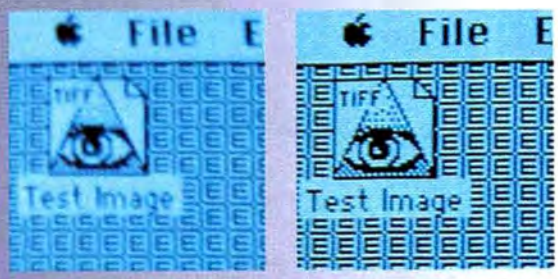
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Figure 4: Focus



The same monitor manufacturer can produce displays of strikingly different quality. The Moniterm Viking 2400 (left) fails to solve the problem of crisp focus on a big-screen monitor. But its little brother, the Viking 2/72 (right), was one of the sharpest medium-sized monitors.

can upgrade the E-Machines QuickView Z21 and Apple Portrait Display and Two-Page Monochrome systems to gray scale by adding memory to their video cards. There are no shades of gray in a monochrome system; its 1-bit card provides just two pixel options—black and white. Apple's upgradable systems ship with 2-bit cards that provide four levels of gray. Strictly speaking, both the Portrait Display and the Two-Page Monochrome monitor are already low-level gray-scale systems, a feature that can be turned on in the Control Panel. Both can also be upgraded to 4 bits (16 grays) with the addition of more memory. E-Machines offers a convenient plug-in memory module for $1,100 that transforms its QuickView Z21 monochrome Mac II system into an 8-bit Z21 IQ gray-scale system with 256 gray levels.

For SE owners, it's hard to beat the RasterOps ClearVue display system. In addition to a bright, crisp 19-inch monitor, you get a video card that doubles as a CPU accelerator. The SE's standard 68000 microprocessor pokes along at a sluggish 7.76 megahertz. The ClearVue's on-board 68000 doubles that speed, and your entire system benefits from the increased performance. There's even a socket for an optional math coprocessor.

No matter which display system you choose, the video card is easy to install—if you have a Mac II. Just open your Macintosh and pop the card into a NuBus slot. Things get more difficult as you move down the evolutionary ladder through the SEs to the Plus. Although SEs have an internal slot ready to accept a video card, the Macintosh must be carefully opened with a special tool before the slot is accessible. The Plus makes matters worse. No slot awaits the video card; instead, the card must be carefully clipped

got it made in the shades.



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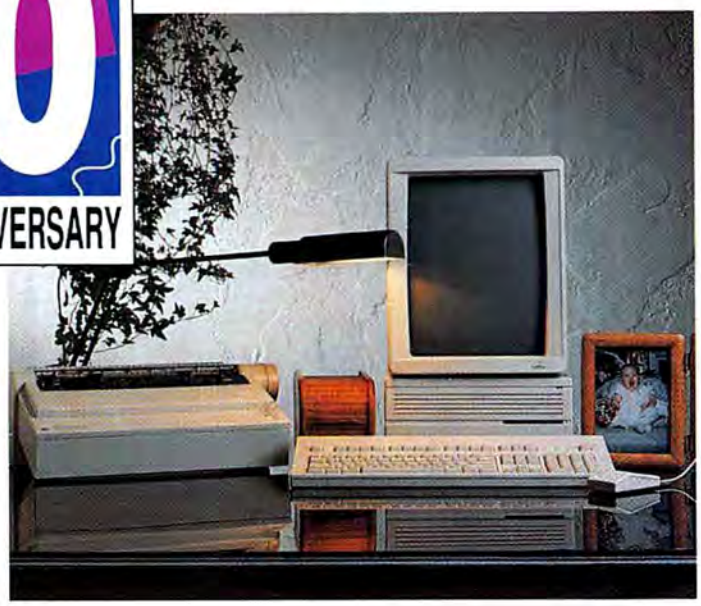
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Macintosh IIcx 105/5 System

More for less. This system is structured to be competitively priced while including all of the components of a more powerful IIcx system. It includes a Quantum 105 megabyte hard drive (2 yr. warranty), one 1.44 Mb FDHD disk drive, 5 megabytes of memory, Keytronics Mac Pro 105 keyboard (3 yr. warranty), Tempo II keyboard software, NEC MacSync 14" High Res RGB monitor with tilt and swivel stand (2 yr. warranty) and all of the listed items*.

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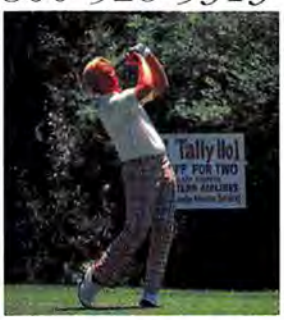
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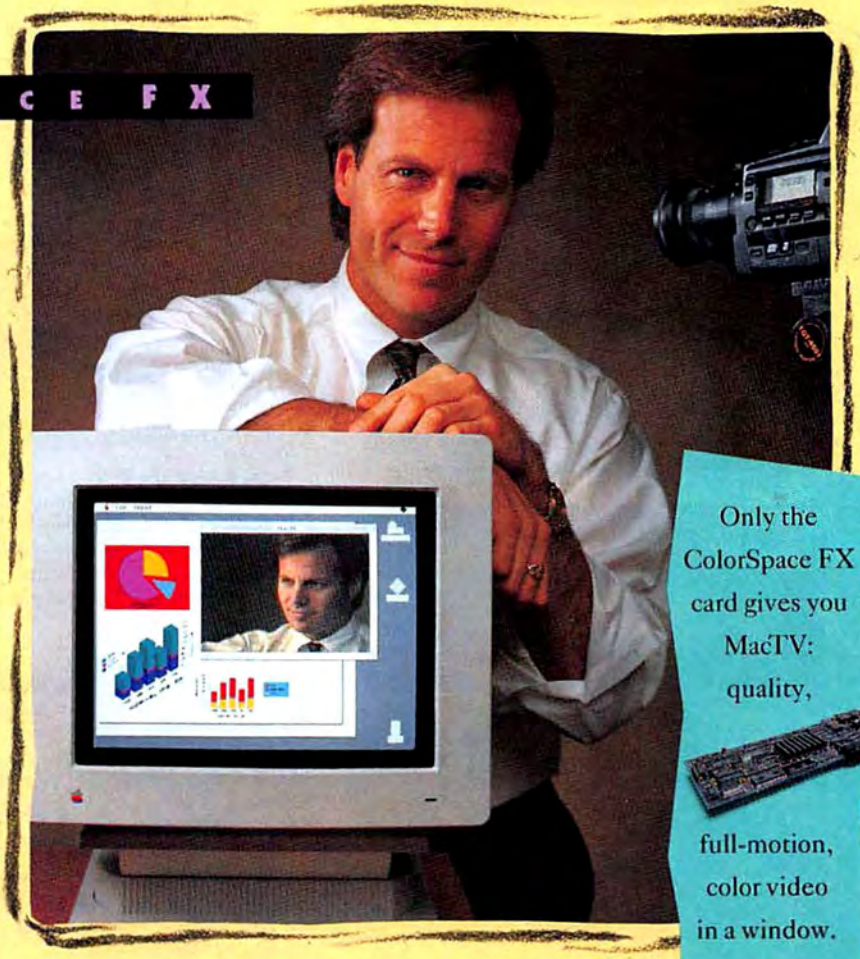
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Small monitors:



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to the appropriate circuitry.

Some manufacturers make this chore even more difficult with sloppy design and poorly-thought-out installation procedures. For example, Micro Display's MacGenius SE system — despite excellent documentation — drove our lab technicians batty with its numerous parts (one of which was missing entirely) and long assembly process. Our advice for SE and Plus owners is to have your dealer install any manufacturer's video card. You'll avoid unnecessary headaches, potentially lethal voltages, and the cancellation of Apple's dinky 90-day warranty.

Software Goodies

If you've lived with a Plus or SE, you'll at first be infatuated with the freedom and potential of a big-screen system. But, as with any relationship, the novelty will soon wear off. You'll begin to notice the disadvantages of so much acreage. The standard 12-point menu bar seems impossibly tiny. The cursor gets lost somewhere in the wide-open spaces, and it takes multiple mouse moves to navigate from the bottom of a spreadsheet to the formula bar.

Many manufacturers have anticipated your frustration and include software that improves the quality of life with a big-screen monitor. When perusing advertisements, however, make sure to read the fine print. Some software works only if the monitor is powered by a Plus or SE; these manufacturers are just getting around to making their software compatible with the more powerful microprocessors in the Mac II and SE/30.

Radius is justly famous for its well-thought-out software, accessible through a cdev (see Figure 2). The software, which has different features for different Macs, provides enlarged menus and an oversized cursor, tear-off menus, and screen-saver and screen-capture utilities. The Full Page Display includes a Wide Screen option that doubles the width of the available work area. You simply scoot your cursor to one edge of the display, and the rest of the *virtual screen* scrolls horizontally into view. Because Radius' virtual-screen scheme uses on-board memory rather than your Mac's RAM, scrolling is quick and smooth.

The E-Machines QuickView Z21 also offers good software plus a virtual-screen option that uses on-board memory. In addition, the same memory-upgrade module that transforms the QuickView into a gray-scale system can be used to increase its virtual-screen size to a whopping 5 x 2.3 feet. Without the extra memory, the virtual screen still reaches a respectable 2.5 x 1.1 feet. The Nutmeg and Ehman systems include Stepping Out II, a software-based virtual-screen utility that can also magnify images up to 16 times. Because Stepping Out II uses the Mac's RAM, however, virtual-screen scrolling isn't as swift or smooth as the board-based method.

MegaGraphics, Micro Display, Nutmeg, RasterOps, and Sigma Designs also offer solid, useful software. Some manufacturers — the most glaring example being Apple — offer no software at all, and others provide minimal features. When making your choice, remember that good software can make life with a monster monitor much more pleasant.

A Sharper Image

Even the most powerful and convenient software can't redeem an unreadable display. An ideal monitor has perfect geometry and focus. Unfortunately for our eyesight, there's no such thing as an ideal monitor. Many monitors have geometry problems, especially at the display's outer edges. Some have a slight inward or outward curve at the edge of the screen or a screen image that tilts to one side. Others, particularly the larger models, display circles as ovals and squares as rectangles. Obviously, such imperfections are unacceptable when you're working with graphics. Even text can be distorted, contributing to eyestrain.

We checked geometric linearity (see Figure 3) with a modified version of Larry Pina's shareware program Test Pattern Generator. The test image is a grid with a large circle in the center and smaller circles in the corners. Monitors with good geometry — such as Apple's High-Resolution Monochrome and Portrait Display — display a square grid with five perfectly round circles. At the opposite end, the viewing areas of the Radius Full Page Display and Moniterm Viking 2400 have shrunken corners that distort circles. Other monitors, such as the Ehman Two Page Display, showed slight but acceptable pincushioning (inward curving of the image) or bowing (outward curving).

A monitor's sharpness, or focus, can make the difference between a finely striped design and a featureless blob. If pixels blur, small details such as thin

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Both screens active	yes	yes
WYSIWYG	no	yes
78hz vertical refresh rate	no	yes
Pop-up/tear-off menus	yes	yes
Cursor sizing	yes	yes
Menu bar sizing	yes	yes
Screen saver	yes	yes
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MegaGraphics MegaScreen Rival



Moniterm Viking 2/72

lines can be fuzzy and small font sizes may be unreadable. Focus isn't generally uniform in all areas of a large CRT screen at the same time, and it's rarely as good at the edges as it is in the center. (Some manufacturers shrink the active screen to avoid troublesome edges.)

Our jury ruled that the 24-inch Moniterm Viking 2400, our largest monitor, had the worst focus (see Figure 4). Part of the problem is simple physics — the farther a beam of electrons must travel, the more it's going to spread. Thus, bigger monitors are harder to focus. Ironically, the Moniterm Viking 2/72 was one of the best-focused medium-sized monitors. The Apple Portrait Display was judged sharpest of all the display systems we tested.

To objectively test screen sharpness, we measured the horizontal and vertical MTF (modulation-transfer function) of each monitor, using a 300-dpi CCD (charge-coupled device) array. In plain English, this means we used a special gadget to compare the contrast of one-pixel-wide black and white lines to that of larger areas of black and white. A monitor with perfect (100 percent) MTF sharpness displays vertical and horizontal stripes with the same contrast as larger areas.

The Sigma Designs L-View achieved an MTF score of 87 percent when tested at its wide-pixel 60-dpi setting, making it an easy winner. But when its resolution was cranked up to 120 dpi, the L-View's MTF rating dropped to 34 percent — fuzzy but still usable. Among 72-dpi display systems, the Moniterm Viking 2/72, Sigma Designs PageView, and Taxan Crystal View led the pack with MTF ratings of just below 80 percent. The Moniterm Viking 2400 fuzzed in at a mere 41 percent.

The MTF results don't always correlate with our jury's subjective focus ratings, however (see Figure 3). That's because the human eye sees focus as a combination of MTF sharpness *and* brightness. For example, the Moniterm Viking 2/72 tied for highest 72-dpi MTF rating with the Taxan Crystal View, but our jury judged its focus to be slightly fuzzier than that of the brighter Apple Portrait Display. The Taxan was rated even lower, since it fell prey to another common failing of big-screen monitors: an unevenly bright display.

Brightness determines how intensely an image is projected on the screen.

whereas *contrast* is the relative difference between dark and light areas. Contrast is important for readability; poor contrast between text and background can cause eyestrain.

Keep in mind that brighter images may not be as sharp. When we measured brightness, we didn't simply crank each monitor all the way up and measure maximum output. Increasing the intensity of an electron beam makes it wider, and it can bleed into adjacent pixels. At maximum brightness, some monitors degenerate into $2,000 night-lights. Instead, we measured maximum *usable* brightness — the brightest setting that can be kept in focus (see Figure 3). The Radius Full Page Display, MegaGraphics MegaScreen Rival, and Micro Display MacGenius were all nearly three times brighter than the Apple High-Resolution Monochrome, E-Machines QuickView Z21, and Moniterm Viking 2400.

Glare and Other Nuisances

A bright screen image helps combat *glare* — room light that reflects off the screen — especially in brightly lit work areas. Glare is commonly referred to as a "nuisance factor," sharing that dubious title with flicker, jitter, noise, and ghosting. Our jury evaluated each monitor on these annoyances and gave it an overall nuisance score (see Figure 3).

To check for glare, turn the monitor off so your observation isn't influenced by screen images. Monitors with untreated glass surfaces can turn into mirrors under some lighting conditions. An etched screen provides moderate glare protection; an OCLI (Optical Coating Labs, Inc.) coating virtually eliminates glare but shows fingerprints with amazing clarity.

There's often a trade-off between glare protection, brightness, and focus. For example, Apple heavily etches the screen of its High-Resolution Monochrome monitor. You get great glare protection, but even though actual focus under the etching is quite good, perceived focus suffers badly. (Hint: To improve the monitor's focus, apply a thin film of the lubricant WD-40 to its deeply etched screen. You'll lose glare protection and your workplace will smell like an auto shop, but the display will be clear and sharp — until you touch it.)

On the other hand, the optional OCLI coating on the Moniterm monitors slightly diminishes brightness but doesn't

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Radius Two Page Display



RasterOps ClearVue



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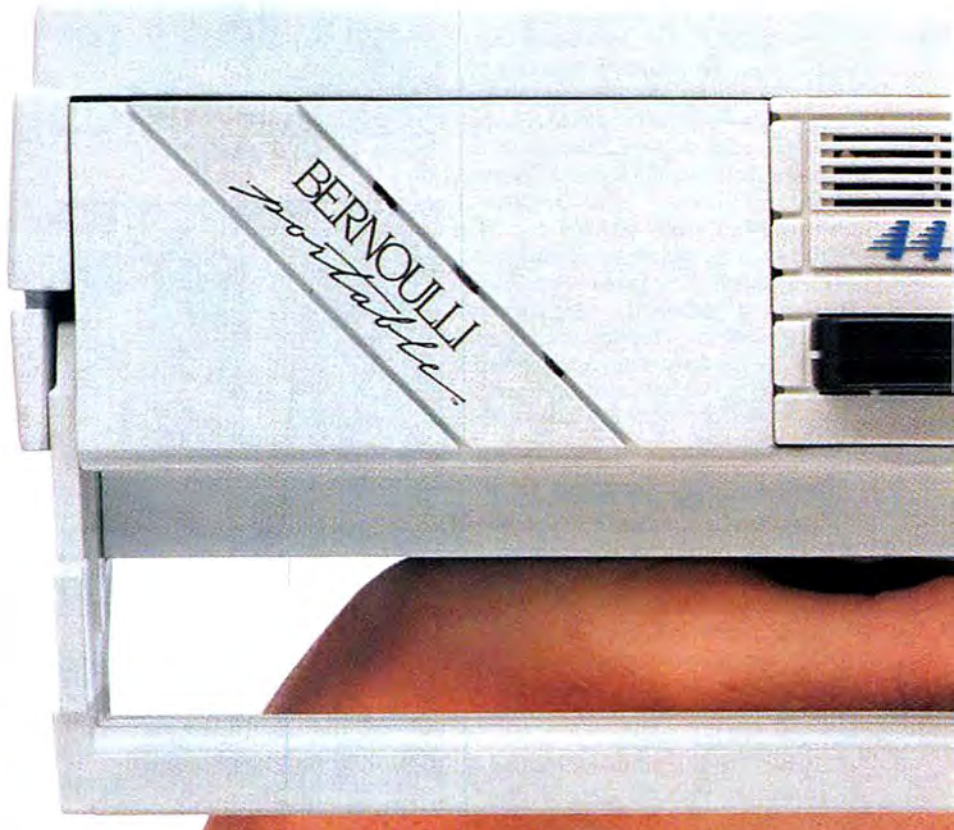


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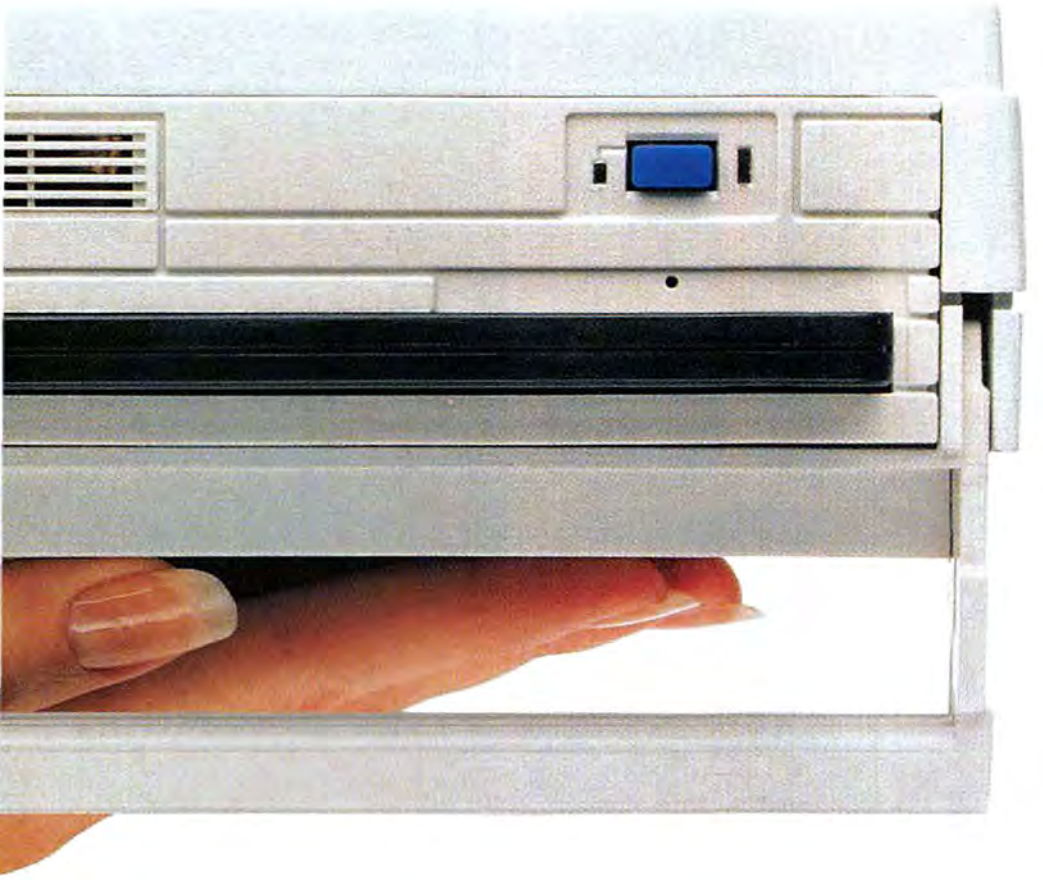


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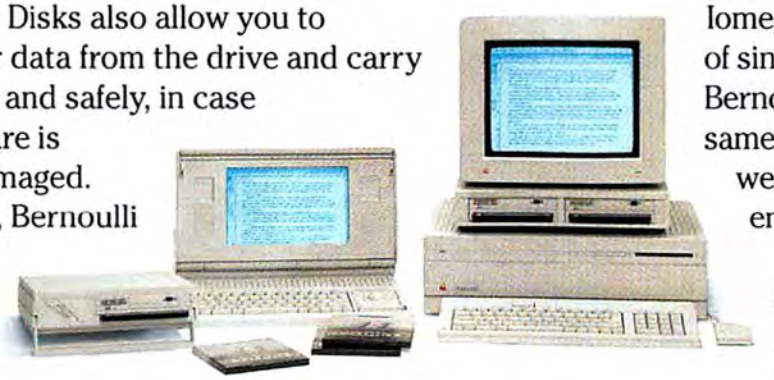
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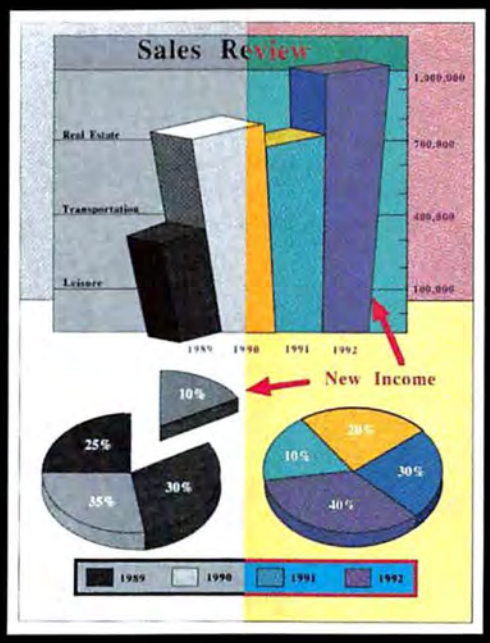
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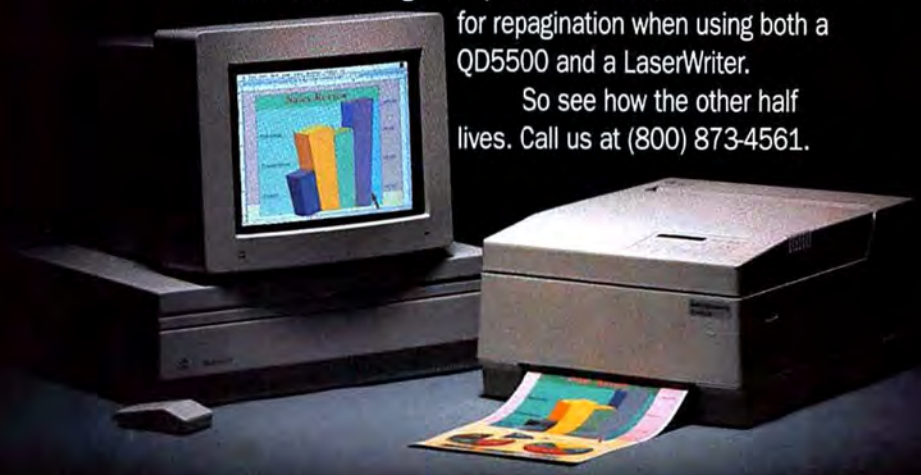
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Large monitors:



Apple Two-Page Monochrome



Moniterm Viking 2400



E-Machines QuickView Z21



Sigma Designs SilverView

noticeably affect focus. The MegaGraphics MegaScreen Rival offers the best of both worlds: Its darkened-glass screen enhances contrast and effectively reduces glare, yet the maximum usable brightness is just below that of the brilliant Radius Full Page Display. The Radius monitor has no glare protection, but since it is so bright, glare is tolerable except under the most extreme conditions.

Don't despair if the monitor you want has poor glare protection. Several third-party manufacturers — such as Polaroid, OCLI, Kensington Microware, and NoRad — offer antiglare screens that can be attached to the front of most monitors. (For more information on glare treatments, see "Black & White & Read All Over," August '88.)

Another common nuisance is *flicker*, a faint (but potentially maddening) pulsing of the screen image. It's caused by the combination of a low vertical scan rate and a short-persistence screen phosphor. Ideally, the electron beam that "paints" the display sweeps across the inner face of the tube (left to right, top to bottom) fast enough that the pixels that should be "on" keep glowing until the next pass of the beam. If the refresh rate is too slow and the phosphors begin to dim, successive screens don't blend together completely and your eyes see each screen being replaced by the next — over and over and over again.

Although the perception of flicker is very subjective, a vertical scan rate of 65 hertz (meaning the screen is refreshed 65 times per second) is generally considered sufficient to eliminate flicker. Our observations bear this out. Only the two Radius monitors displayed any discernible flicker, and then only when their brightness was turned up above typical levels. Even systems with a 60-hertz refresh rate — the Micro Display MacGenius, Sigma Designs L-View, and E-Machines The

Late Arrivals

Do you like the extra pixels provided by Radius' 19-inch Two Page Display (TPD) but find the image size at 82-dpi resolution too small for your liking? Take heart — it now has a larger cousin, the Two Page Display/21, which lists at $2,390 for a complete system. The TPD/21 is designed with the same ergonomics and features as the TPD/19, but it displays information at an almost-WYSIWYG 74 dpi. Our initial look at the TPD/21 revealed it to be just as good as the TPD/19. Both monitors can also be paired with Radius' gray-scale card, which provides 8-bit gray scale for an additional $1,300. Radius, 1710 Fortune Drive, San Jose, CA 95131; (800) 227-2795 or (408) 434-1010.



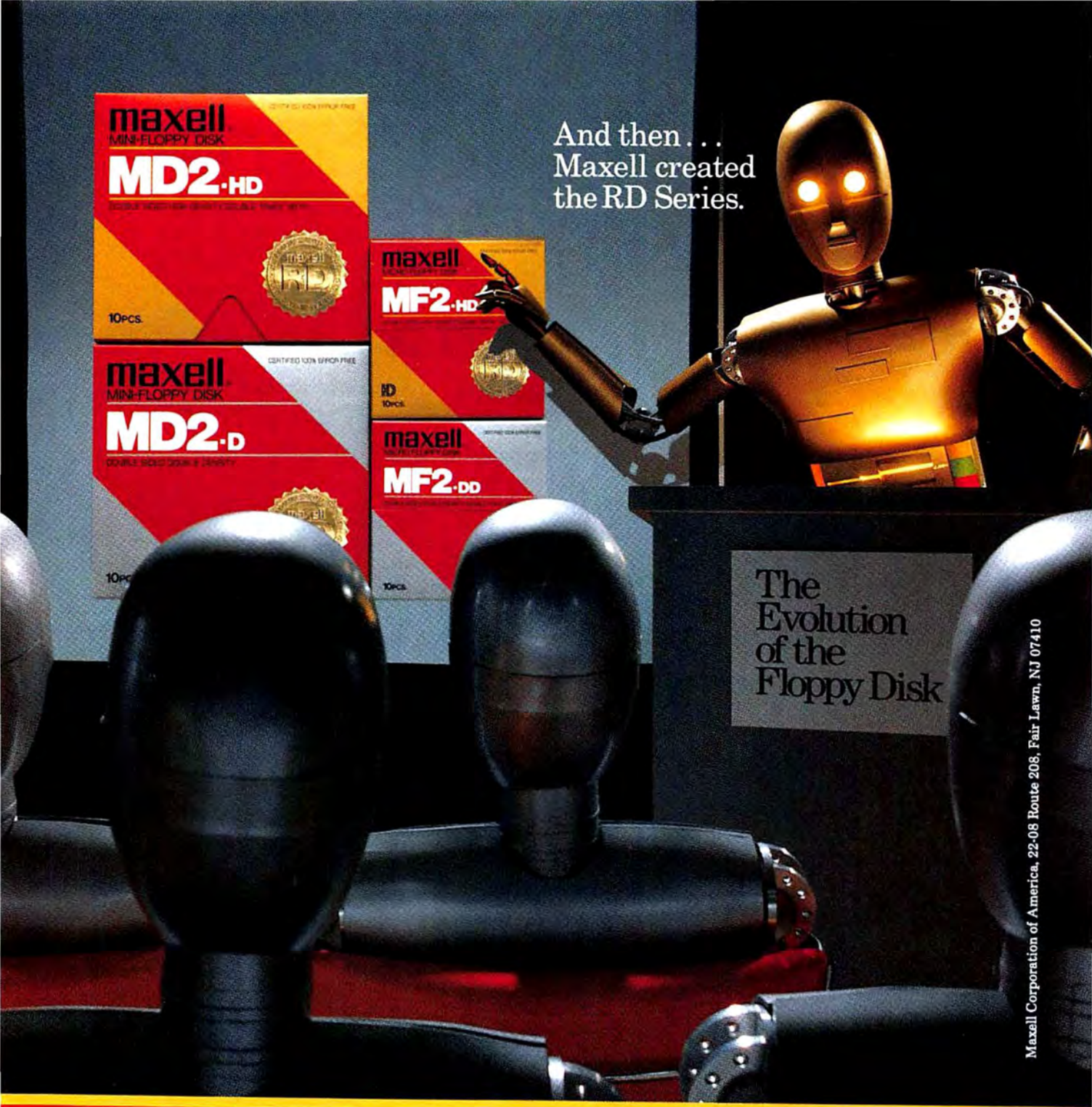
The Radius Two Page Display/21

SuperMac is shipping its new Grayscale/Monochrome Display ($1,399 for the monitor alone), which is similar to the Moniterm Viking 2/72 evaluated in this report, with a few minor exceptions. The monitor is manufactured to SuperMac's own specifications, the case color more closely matches the Mac's platinum finish, and OCLI glare protection is a standard feature. We paired a prototype unit with SuperMac's Spectrum/8 Series III color/gray-scale video card and obtained a bright, sharp screen image with excellent glare resistance and contrast at 72 dpi. Monochrome video cards should be shipping by now; no prices were available at press time. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086; (408) 245-2202.



The SuperMac Grayscale/ Monochrome Display

— Jeff Pittelkau



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THE GOLD STANDARD

Big Picture — showed only a hint of flicker.

Jitter and *noise* reveal their presence through wiggling pixels, but the sources of these problems are different. Generally, jitter is the fault of poor monitor electronics or voltage irregularities when a disk drive is accessed. None of the monitors we tested exhibited significant jitter. Noise, however, can be blamed on the outside world. All monitors are susceptible to noise generated by EMI (electromagnetic interference). The biggest sources of this image-distorting force are transformers. AC motors such as those in vacuum cleaners and electric pencil sharpeners, and other monitors. Although it's unlikely that you'll mount your monitor next to an AC motor (disk drives use DC), you should make sure to distance your monitor from transformers such as the one in your modem's power adapter.

The most annoying EMI problems occur on display systems powered by a Plus or SE. Compact Macs are notorious for spewing EMI from their left sides — the side with all the high-voltage video circuitry. Radius took this into account when designing its Full Page Display and wrapped the CRT in an EMI-defeating aluminum-alloy shield. Sigma Designs' PageView, on the other hand, is extremely susceptible to EMI and must be kept at least a foot away from the offending Mac.

A final nuisance, *ghosting*, results from a screen phosphor with a high degree of persistence. That is, each pixel continues to glow for a long time after electrons are no longer striking it — causing an afterimagelike effect in your eye. A high-persistence phosphor helps fight flicker, but it also leads to excessive ghosting. Fortunately, ghosting is rarely a problem with current phosphor technology. Only the Micro Display MacGenius and E-Machines The Big Picture spooked us with excessively ghostly performances.

The Eyes Have It

Price, size, resolution, upgrade potential, ease of installation, software, sharpness, geometry, brightness, contrast, glare protection, flicker, phosphor quality — we warned you that choosing the right monochrome display system involves many factors. Or, to look at it another way, there are only two things that really count: your right eye and your left eye. This report reveals how each display system performed in our battery of tests. Read "The Bottom Line" to find out which ones we'd buy. After weighing the facts and figures, it's up to you to make the final cut.

Call up your favorite computer stores, and track down the monitors that interest you. Have a salesperson set them up side by side. Let each warm up for a good 15 minutes, and then eyeball them for as long as you need to winnow out your personal favorite. Only with your own two eyes can you effectively compare displays. Remember, you'll stare at your monitor for far more hours per day than you gaze into the eyes of your beloved — take time to find the prettiest face.

In addition to fulfilling his duties as daddy to two young daughters, Rik Myslewski squeezes in time to be an associate editor at *MacUser*.

The Bottom Line

Nothing influences how you feel about your Mac more than its display system. A fast CPU or hard drive may speed your day's work, and brilliant software can give you powers you've never experienced before. But if your path to these wonders is through an ugly, impossibly fuzzy display, your day is ruined.


Apple Portrait Display

Choosing the right display system is a somewhat subjective experience. Even our jurors disagreed on how many mice to award each system — with one exception. The **Apple Portrait Display** ($1,698) earned a full five mice from every juror. This 15-inch system for the Mac II has a bright, crisp display; good glare protection; perfect geometry; and almost no nuisance factors. The Portrait Display is one of those rare instances in which nearly everything appears to have been done right. The only drawback is its lack of software.

Among medium-sized monitors, there was a split decision. The **RasterOps ClearVue** ($1,995) scored well because of its high MTF rating, good focus and brightness, and excellent software. Although some jury members rated it high in nuisance factors, others found its jitter and noise well within acceptable limits. This system is a definite "best buy" for Macintosh SE owners, because the video board has a CPU accelerator.


RasterOps ClearVue


Sigma Designs L-View

We can also recommend the **Sigma Designs L-View** ($2,495). Its outstanding feature is a remarkably well focused 120-dpi mode.

If you need to view enormous amounts of information on one screen, you can't do much better than 1,996,800 pixels' worth of display space.


Sigma Designs SilverVue

As for the large monitors, our nod goes to another product from Sigma Designs, the **SilverView** ($1,995). For just a bit more than you'd pay for most 19-inch monitors, you get a bright, well-focused 21-inch model with good software. The **Apple Two-Page Monochrome** ($2,495) display system includes a card that can be upgraded to 256 levels of gray, but we felt that its dim display and high price kept it a notch below the SilverView.


Apple Two-Page Monochrome



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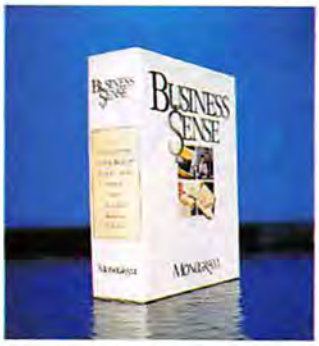
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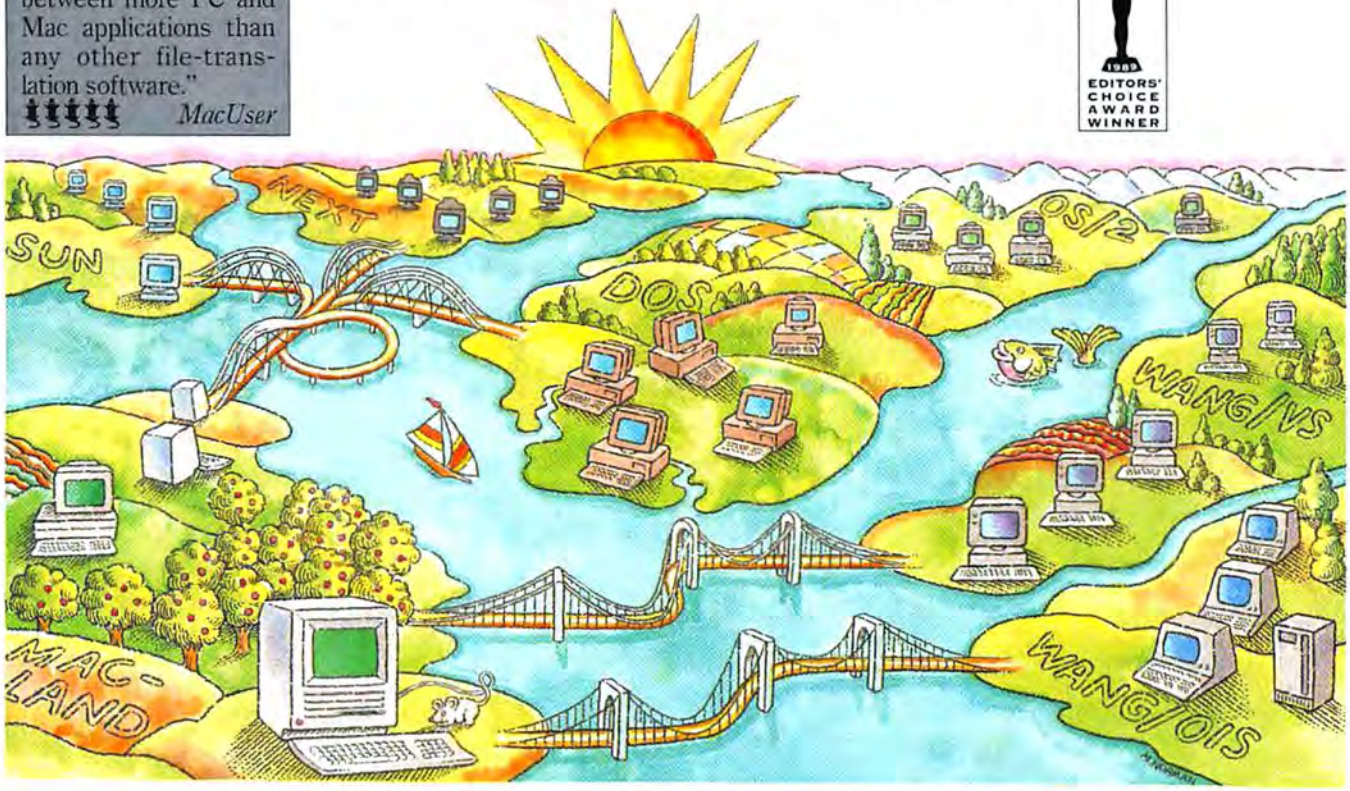
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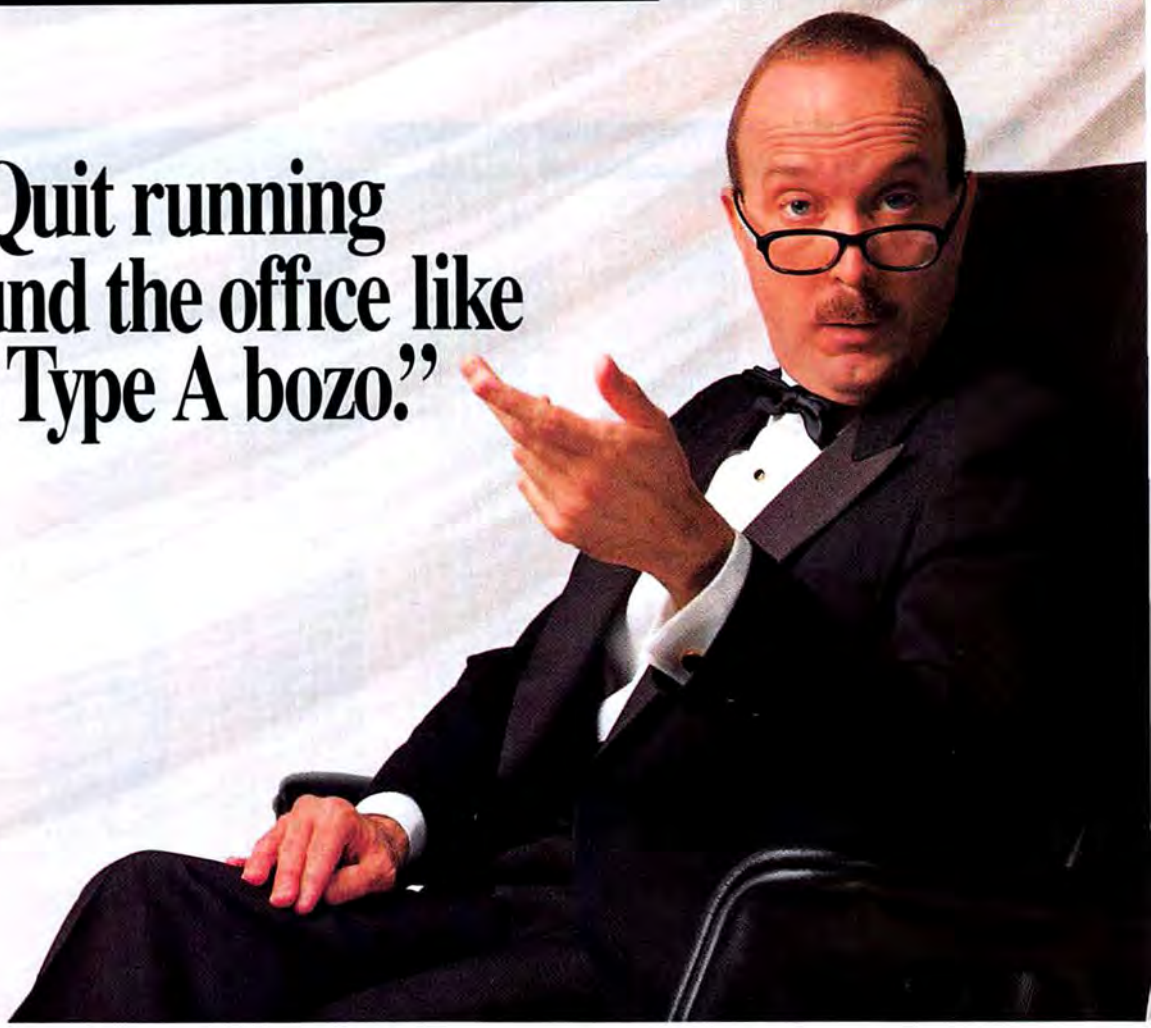
Table 1: Features of Monochrome Display Systems

	Small **Apple Plus and SE**	Small **Apple High-Res Monochrome**	Small **Apple Portrait Display**	Small **Micro Display MacGenius**	Small **Radius Full Page Display**
Mouse rating	↕↕↕↕	↕↕↕	↕↕↕↕↕	↕↕↕↕	↕↕↕↕
Comments	Bluish phosphor. Slightly dim. Low MTF but excellent subjective focus. Excellent geometry.	Inexpensive. Good geometry. No software. Antiglare etching causes focus problems. Very dim.	Excellent focus, geometry, and brightness. Few nuisances. No software. Three ADB connectors on back.	Warmest phosphor. Very bright. Good software with inverse video. Inexpensive SE and Plus models. Difficult to install.	Brightest. Excellent software with virtual screen. Slight flicker at very high brightness. Good EMI shielding. Poor geometry.
List price					
Mac Plus system	NA	NA	NA	$995	$1,490
Mac SE system	NA	NA	NA	$995	$1,490
Mac SE/30 system	NA	NA	NA	NA	$1,490
Mac II system	NA	$598	$1,698	$1,495	$1,490
Monitor specifications					
Orientation	landscape	landscape	portrait	portrait	portrait
Tube manufacturer	Clinton	Clinton	Toshiba	Clinton	Philips
CRT size (diagonal [inches])	9 in.	12 in.	15 in.	15 in.	15 in.
Active screen size (diagonal [inches])	8 in.	10.3 in.	13.5 in.	13 in.	14 in.
Dimensions (W x H [pixels])	512 x 342	640 x 480	640 x 870	640 x 860	640 x 864
Resolution (dots per inch)	72 dpi	74 dpi	80 dpi	80 dpi	77 dpi
Vertical scan rate (hertz)	60 Hz	66.7 Hz	75 Hz	60 Hz	69 Hz
Horizontal scan rate (kilohertz)	22.25 kHz	35 kHz	68.85 kHz	62 kHz	64 kHz
Bandwidth (megahertz)	15 MHz	30.24 MHz	52 MHz	70 MHz	50 MHz
Other					
Gray-scale capable card	NA	no†	yes	no	no
Glare treatment	silica coating	etched	silica coating	etched	none
Tilt/swivel stand	NA	optional ($89)	optional ($89)	yes	yes
Video-cable length (feet)	NA	6 ft	6 ft	4 ft	6 ft
Brightness/contrast controls	front*	side	side	side	rear*
Power switch	rear	rear	rear	side	rear
Power indicator	NA	yes	yes	yes	no
Power consumption (watts)	NA	40 watts	75 watts	55 watts	100 watts
Dimensions (W x H x D [inches])	NA	12.25 x 10.75 x 14.5	11.5 x 15 x 14.25	12.5 x 16.5 x 13	11 x 13.5 x 13.75
Weight (pounds)	NA	17 lb	35 lb	38 lb	35 lb
Software; compatible Macs	no	no	no	Plus, SE	Plus, SE, SE/30, Mac II
Warranty	90 days	90 days	90 days	1 year	1 year
Manufacturer	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Micro Display Systems 1310 Vermillion St. Hastings, MN 55033 (800) 328-9524 (612) 437-2233	Radius 1710 Fortune Drive San Jose, CA95131 (800) 227-2795 (408) 434-1010

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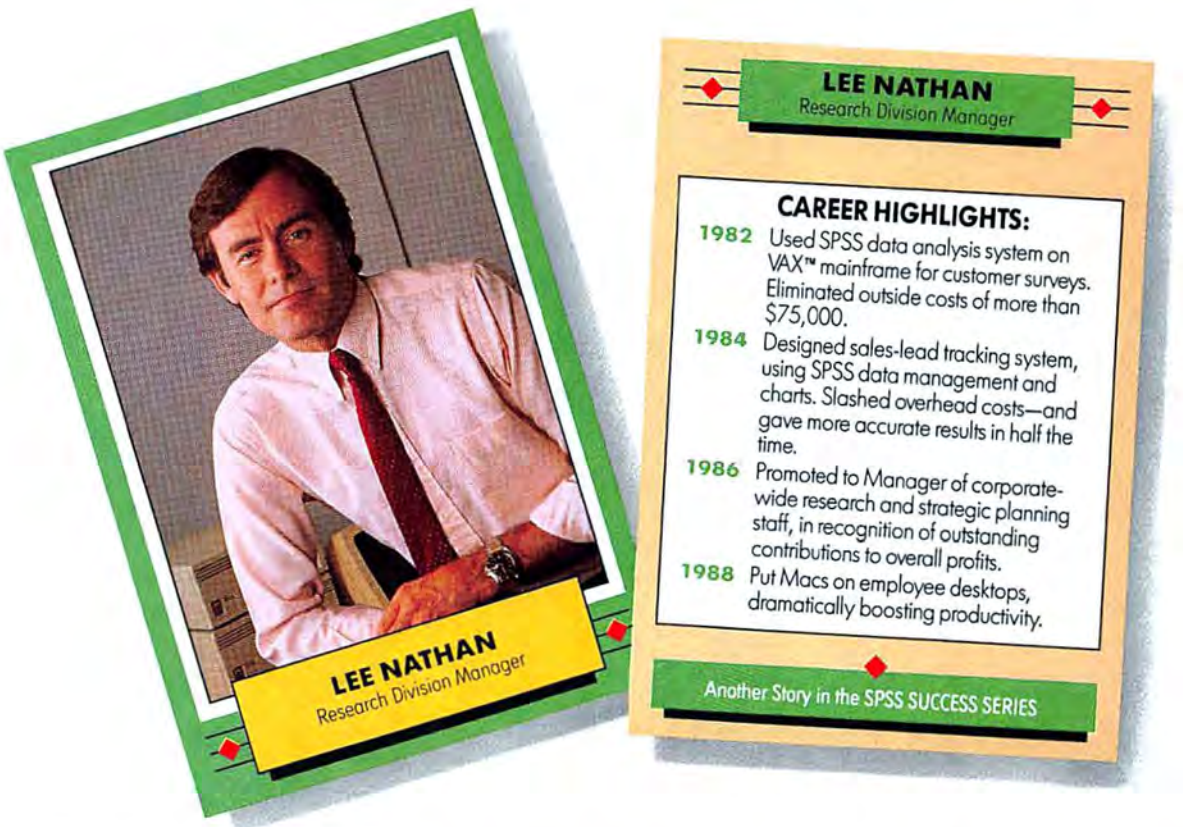
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Table 1: Features of Monochrome Display Systems, continued

	Small	Medium	Medium	Medium	Medium
	Sigma Designs PageView	**Ehman Two Page Monitor**	**E-Machines The Big Picture 17"**	**MacProducts MagicView 19**	**MegaGraphics MegaScreen Rival**
Mouse rating	↕↕↕↕	↕↕↕½	↕↕↕	↕↕↕½	↕↕↕↕
Comments	Three dpi settings. Good software. Good focus. Inexpensive Mac II and SE/30 models. Poor EMI shielding. Fair geometry.	Least expensive in category. Good brightness and focus. Fair nuisance rating. Bundled with Stepping Out II software.	Greenish high-persistence phosphor. Low MTF, but satisfactory subjective focus. Uneven brightness. Mild ghosting.	Inexpensive. Bright. Fair focus. Bluish phosphor. No software. Good geometry within tilted and off-center display.	True white phosphor. Deep blacks. Second brightest. Average focus and geometry. Good software.
List price					
Mac Plus system	NA	NA	$1,695	$999	$1,748
Mac SE system	$1,299	$899	$1,695	$999	$1,698
Mac SE/30 system	$1,399	$899	NA	$999	$1,698
Mac II system	$1,399	$899	$1,795	$999	$1,698
Monitor specifications					
Orientation	portrait	landscape	landscape	landscape	landscape
Tube manufacturer	Clinton	Hyundai	Panasonic	Sampo	Zenith
CRT size (diagonal [inches])	15 in.	19 in.	17 in.	19 in.	19 in.
Active screen size (diagonal [inches])	13.5 in.	17.75 in.	15.2 in.	18 in.	17.5 in.
Dimensions (W x H [pixels])	576 x 768; 640 x 870; 704 x 949	1,024 x 769	1,024 x 808	1,024 x 768	1,024 x 826
Resolution (dots per inch)	72, 80, or 88 dpi	73 dpi	85 dpi	72 dpi	75 dpi
Vertical scan rate (hertz)	80, 86, or 97 Hz	78 Hz	60 Hz	78 Hz	75 Hz
Horizontal scan rate (kilohertz)	79 kHz	62.5 kHz	51 kHz	65 kHz	64.7 kHz
Bandwidth (megahertz)	70 MHz	100 MHz	68 MHz	100 MHz	100 MHz
Other					
Gray-scale capable card	no	no	no	no	no
Glare treatment	none	none	none	none	darkened glass
Tilt/swivel stand	yes	yes	no	yes	yes
Video-cable length (feet)	6 ft	6 ft	2 ft	6 ft	5 ft
Brightness/contrast controls	front	rear*	front*	side*	side*
Power switch	front	rear	rear	side	side
Power indicator	yes	no	no	yes	yes
Power consumption (watts)	35 watts	65 watts	70 watts	65 watts	144 watts
Dimensions (W x H x D [inches])	11 x 16.25 x 14	18 x 17.75 x 15	16 x 15.25 x 14.75	19 x 18 x 17	18.5 x 17.5 x 15
Weight (pounds)	21 lb	62 lb	38 lb	46 lb	46 lb
Software; compatible Macs	SE, SE/30, Mac II	SE, SE/30, Mac II	Plus, SE, Mac II	no	Plus, SE
Warranty	1 year	1 year	1 year	1 year	1 year
Manufacturer	Sigma Designs 46501 Landing Fwy. Fremont, CA 94538 (415) 770-0100	Ehman 97 S. Red Willow Road Evanston, WY 82930 (800) 257-1666 (307) 789-3830	E-Machines 9305 S.W. Gemini Drive Beaverton, OR 97005 (503) 646-6699	MacProducts, USA 8303 Mopac Expy., Suite E Austin, TX 78759 (800) 622-3475 (512) 343-9441	MegaGraphics 439 Calle San Pablo Camarillo, CA 93010 (800) 423-0183 (805) 484-3799

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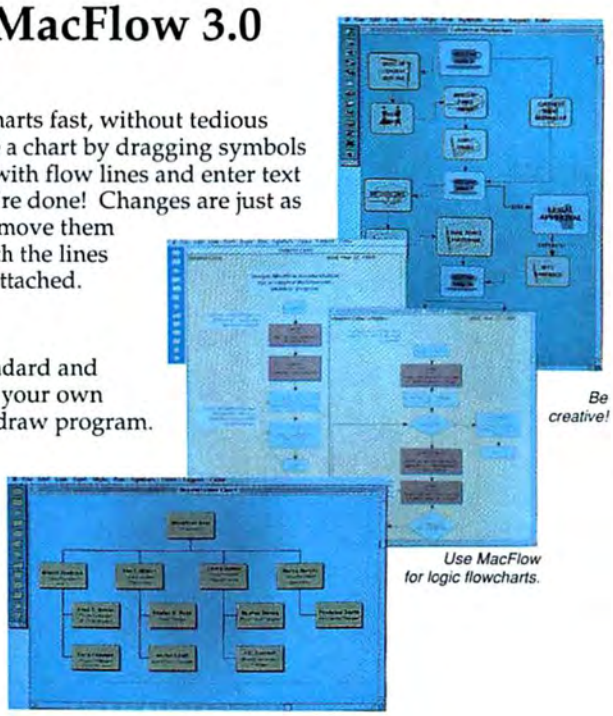
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Table 1: Features of Monochrome Display Systems, continued

	Medium **Moniterm Viking 2/72**	Medium **Nutmeg 19" Mono Display**	Medium **Radius Two Page Display**	Medium **RasterOps ClearVue**	Medium **Sigma Designs L-View**
Mouse rating	↕↕↕↕	↕↕↕↕	↕↕↕↕	↕↕↕↕½	↕↕↕↕½
Comments	Optional OCLI coating for glare protection. Excellent MTF and subjective focus. Few nuisances.	Bright. Average focus; fair geometry. Bluish phosphor with yellowish center. Good software; includes Stepping Out II.	Bright. Good focus. Cool phosphor. Fair nuisance rating. Excellent software with tear-off menus.	Bright. Excellent MTF and subjective focus. Fair nuisance rating. Good software. SE system includes CPU accelerator.	High-resolution mode. Best MTF at 60 dpi, worst at 120 dpi. Good software. Horizontal-centering control. Expensive.
List price					
Mac Plus system	NA	$1,699	NA	NA	NA
Mac SE system	$1,795	$1,699	$1,990	$1,995	$2,395
Mac SE/30 system	$1,795	$1,699	$1,990	NA	$2,495
Mac II system	$1,795	$1,699	$1,990	$1,995	$2,495
Monitor specifications					
Orientation	landscape	landscape	landscape	landscape	landscape
Tube manufacturer	Philips	Sampo	Philips	Sampo	Clinton
CRT size (diagonal [inches])	19 in.	19 in.	19 in.	19 in.	19 in.
Active screen size (diagonal [inches])	17.75 in.	17.5 in.	17.75 in	17.5 in.	17.5 in.
Dimensions (W x H [pixels])	1,024 x 768	1,024 x 768	1,152 x 882	1,024 x 768	832 x 600; 1,664 x 1,200
Resolution (dots per inch)	72 dpi	72 dpi	82 dpi	72 dpi	60 or 120 dpi
Vertical scan rate (hertz)	66 Hz	78 Hz	71 Hz	72 Hz	60 Hz
Horizontal scan rate (kilohertz)	66 kHz	64 kHz	65 kHz	64 kHz	75 kHz
Bandwidth (megahertz)	110 MHz	100 MHz	100 MHz	100 MHz	160 MHz
Other					
Gray-scale capable card	no†	no	no†	no	no
Glare treatment	optional OCLI ($200)	none	none	none	optional OCLI ($200)
Tilt/swivel stand	yes	yes	yes	yes	yes
Video-cable length (feet)	6 ft	6 ft	6 ft	6 ft	6 ft
Brightness/contrast controls	front*	side*	front	side*	front
Power switch	front	side	front	side	side
Power indicator	yes	yes	yes	yes	yes
Power consumption (watts)	60 watts	65 watts	100 watts	65 watts	135 watts
Dimensions (W x H x D [inches])	18.5 x 17.5 x 14.5	19 x 18 x 16	18 x 15.5 x 16.5	19 x 17.5 x 16	19 x 18 x 17
Weight (pounds)	39 lb	46 lb	55 lb	55 lb	51 lb
Software; compatible Macs	SE	Plus, SE, SE/30, Mac II	SE, SE/30, Mac II	SE	SE, SE/30, Mac II
Warranty	1 year	1 year	1 year	1 year	1 year
Manufacturer	Moniterm 5740 Green Circle Drive Minnetonka, MN 55343 (612) 935-4151	Nutmeg Systems 25 South Ave. New Canaan, CT 06840 (203) 966-3226	Radius 1710 Fortune Drive San Jose, CA 95131 (800) 227-2795 (408) 434-1010	RasterOps 2500 Walsh Ave. Santa Clara, CA 95051 (800) 468-7600 (408) 562-4200	Sigma Designs 46501 Landing Fwy. Fremont, CA 94538 (415) 770-0100

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MacUSER LABS

Table 1: Features of Monochrome Display Systems, continued

	Medium	Large	Large	Large	Large
	Taxan Crystal View	**Apple Two-Page Monochrome**	**E-Machines QuickView Z21**	**Moniterm Viking 2400**	**Sigma Designs SilverView**
Mouse rating	★★★★	★★★★	★★★½	★★½	★★★★
Comments	Bright. Poor subjective focus despite high MTF. Uneven screen coloration, with yellowish center. Good geometry.	Dim. Good focus. Moderate glare protection. Simple gray-scale upgrade. No software. Small active screen. Expensive.	Four dpi settings. Virtual screen. Simple gray-scale upgrade. Good software. Dim. Low MTF, average subjective focus.	Fewest nuisances. Worst MTF and focus. Poor geometry. Optional OCLI coating for glare protection.	Bright. Good focus; fair geometry. Horizontal-centering control. Good software. Fair nuisance rating. Inexpensive.
List price					
Mac Plus system	NA	NA	NA	NA	NA
Mac SE system	$1,695	NA	$2,395	$2,595	$1,999
Mac SE/30 system	$1,695	NA	$2,495	NA	$1,999
Mac II system	$1,695	$2,748	$2,495	$2,595	$1,999
Monitor specifications					
Orientation	landscape	landscape	landscape	landscape	landscape
Tube manufacturer	Philips	Toshiba	Toshiba	Clinton	Toshiba
CRT size (diagonal [inches])	19 in.	21 in.	21 in.	24 in.	21 in.
Active screen size (diagonal [inches])	17.75 in.	18.8 in.	20.1 in.	22 in.	20 in.
Dimensions (W x H [pixels])	1,024 x 768	1,152 x 870	1,280 x 960; 1,152 x 864; 640 x 480; 576 x 432	1,280 x 960	1,152 x 870
Resolution (dots per inch)	72 dpi	77 dpi	36, 40, 72, or 80 dpi	72 dpi	72 dpi
Vertical scan rate (hertz)	78 Hz	75 Hz	70 or 76 Hz	66 Hz	73 Hz
Horizontal scan rate (kilohertz)	64 kHz	68.7 kHz	68.4 kHz	66 kHz	66.5 kHz
Bandwidth (megahertz)	105 MHz	100 MHz	99 or 110 MHz	110 MHz	100 MHz
Other					
Gray-scale capable card	no	yes	yes	no	no†
Glare treatment	none	silica coating	etched	optional OCLI ($600)	none
Tilt/swivel stand	yes	yes	yes	no	yes
Video-cable length (feet)	6 ft	6 ft	6 ft	6 ft	6 ft
Brightness/contrast controls	side*	side	side	rear*	front
Power switch	side	rear	rear	rear	side
Power indicator	yes	yes	no	no	yes
Power consumption (watts)	70 watts	95 watts	90 watts	60 watts	115 watts
Dimensions (W x H x D [inches])	19 x 18 x 16	19.5 x 19 x 17	19.5 x 18.75 x 15.5	21 x 17.75 x 17	19 x 17.5 x 17.5
Weight (pounds)	48 lb	55 lb	60 lb	50 lb	51 lb
Software; compatible Macs	no	no	SE, SE/30, Mac II	SE	SE, SE/30, Mac II
Warranty	1 year	90 days	1 year	1 year	1 year
Manufacturer	Taxan 161 Nortech Parkway San Jose, CA 95134 (408) 946-3400	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	E-Machines 9305 S.W. Gemini Drive Beaverton, OR 97005 (503) 646-6699	Moniterm 5740 Green Circle Drive Minnetonka, MN 55343 (612) 935-4151	Sigma Designs 46501 Landing Fwy. Fremont, CA 94538 (415) 770-0100

*No contrast control.
†Monochrome card not upgradable to gray-scale, but separate gray-scale card available.

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Mac USER LABS BRIEF

Print Spoolers

Spoolers breathe new life into the purgatory of printer procrastination.

The time spent waiting for printouts is a common source of frustration for Mac users. You can twiddle your thumbs till they're numb, but you still have to wait for a printer to complete a document before it will relinquish control of your Mac and allow you to work on it again. This downtime — which begins when you click OK in the print dialog box and ends when the wristwatch icon finally disappears — can significantly decrease your productivity. The solution to this problem is simple: You need a print spooler. It'll revive your productivity, getting your fingers back to work on the keyboard in seconds rather than minutes.

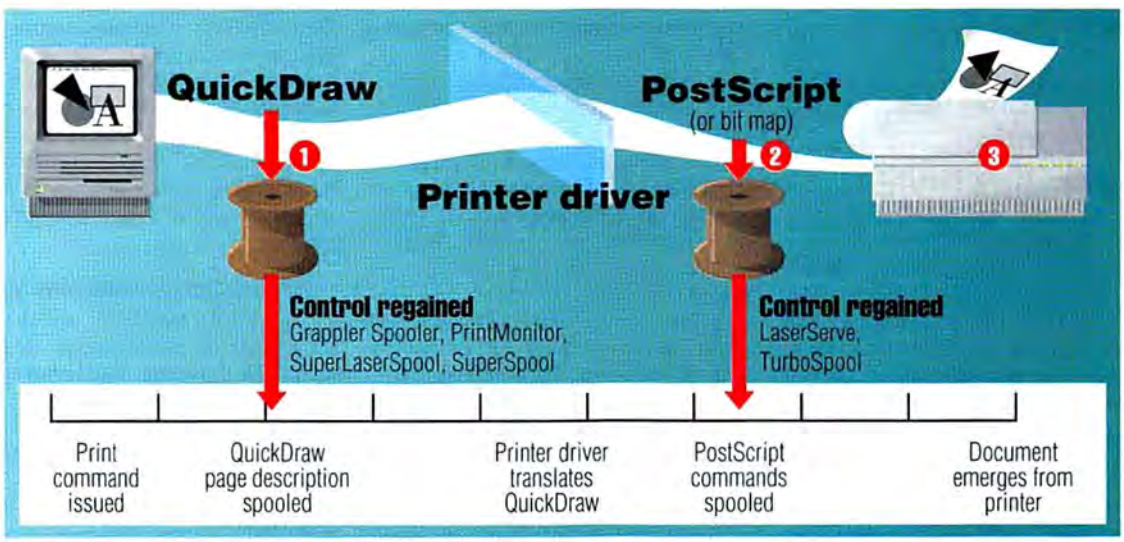
With such obvious benefits at stake, it's high time MacUser Labs gave you the lowdown on the current crop of software print spoolers — Grappler Spool, LaserServe, PrintMonitor, SuperLaserSpool, SuperSpool, and TurboSpool — available for the ImageWriter and LaserWriter families of printers and compatibles. These six programs range in price from free (PrintMonitor) to $150 (SuperLaserSpool) and can be used by anyone from a Mac Plus user with an ImageWriter to a Mac IIci user networked to a LaserWriter. All these spoolers run locally on your Macintosh, in contrast to network spoolers that run on servers. (Even if your server has a spooler, spooling to your local hard disk lets you avoid the LocalTalk bottleneck.) Orange Micro's Grappler Spooler and SuperMac's SuperSpool work only with serially connected ImageWriters and compatibles. Apple's PrintMonitor and PLI's TurboSpool work only with PostScript laser printers using Apple's LaserWriter driver. Infosphere's LaserServe works with these laser printers and AppleTalk-connected ImageWriters, and SuperMac's SuperLaserSpool works with all the above (see Table 1).

MacUser Labs' test system consisted of a Mac SE with an internal 40-megabyte hard-disk drive, 2.5 megabytes of RAM, an ImageWriter II (with Apple's LocalTalk board installed during the LaserServe tests), and a LaserWriter IINTX with the standard complement of RAM. All benchmarks were run with ImageWriter version 2.7 and LaserWriter version 5.2 drivers. None of the spoolers works with the newer LaserWriter driver 6.0 — which supports color and halftone images — but all the publishers were working on updates at press time.

We clocked each spooler as it printed four different types of documents, chosen to represent a real-world sample of diverse print jobs. Our technicians also measured performance degradation of foreground applications to see if you can get anything accomplished once the Mac has transferred your files to the spooler.

By Howard Bornstein and the MacUser Labs staff

Figure 1: How It Works



The primary difference among print spoolers is the point at which they intercept the print command. Spoolers that grab the QuickDraw output (1) of applications can return control of the Mac to the user quickly. Spoolers that snag the printer driver's output (2) tend to take a bit longer. Either type of spooler is usually better than none at all (3).

ILLUSTRATIONS K. DANIEL CLARK

Table 1: Features of Print Spoolers

	Grappler Spooler	LaserServe	PrintMonitor	SuperLaserSpool
Mouse rating	↕↕↕	↕↕↕	↕↕↕	↕↕↕↕
Version reviewed	1.0	2.0	1.2	2.0
List price	$79	$95	free	$149.95
Warranty	1 year	90 days	90 days	90 days, 30-day guarantee
Compatibility				
ImageWriter (serial)	yes	no	no	yes
ImageWriter (AppleTalk)	no	yes	no	yes
LaserWriter	no	yes	yes	yes
LaserWriter driver 6.0	NA	no*	no*	no*
MultiFinder	yes	yes	yes†	yes
Features				
Implementation	cdev	desk accessory	MultiFinder application	desk accessory
Variable RAM buffer	no	no	no	yes
Multiple printing from queue	yes	yes	no	no
Generates log	no	no	no	no
Changes destination printer	no	no	no	yes
Previews spooled files	no	no	no	yes
Error alerts	vague	specific	none§	none§
Copy protection	none	AppleTalk scan, key disk	none	AppleTalk scan
Publisher	Orange Micro 1400 N. Lakeview Ave. Anaheim, CA 92807 (714) 779-2772	Infosphere 4730 S.W. Macadam Portland, OR 97201 (800) 445-7085 (503) 226-3620	Apple Computer 50525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (408) 245-2202

*Feature promised in future upgrade.
†Requires MultiFinder.
§Errors are registered, but no alert appears.

Finally, we evaluated how well the spoolers reacted to a wide range of common error conditions such as system crashes, PostScript problems, and the printer being out of paper.

How They Work

To appreciate the value of spoolers, you must understand how the Mac normally prints. When you create a MacDraw II drawing, for instance, the document is represented internally as a series of QuickDraw commands. When you select Print, this QuickDraw representation is sent to the printer driver, a Chooser document that converts QuickDraw into the commands necessary to reproduce the image on the printer. Apple's LaserWriter driver translates the QuickDraw page description into the PostScript commands required by the LaserWriter. Unfortunately, the driver doesn't relinquish control of the Mac until the entire document has been passed along to the printer. And since printers are slow mechanical beasts with small input buffers, this can take a considerable amount of time.

Spoolers (*spool* stands for *simultaneous peripheral operations on-line*) are small programs that speed up the process of transferring a document to a printer by intercepting output intended for the printer and storing it temporarily on a relatively faster device: a hard disk. As spool files are written to the hard disk, they get placed in a queue to be printed on a first-come, first-served basis, and you regain control of the computer. As you're busy doing other work, the print spooler — behind your back, so to speak — sends the output to the printer. You can get back to work shortly after issuing a Print command, while documents print unattended in the background.

The primary difference among spoolers is the point at which they intercept the print commands. Grappler Spooler, PrintMonitor, SuperLaserSpool, and SuperSpool grab the QuickDraw output before it gets to the printer driver (see Figure 1). They relinquish control of the Mac once the entire QuickDraw description's been captured. In contrast, LaserServe and TurboSpool snag the output of the printer driver. Because they wait until the document has been converted before relinquishing control, postdriver spoolers are slower by design than predriver spoolers.

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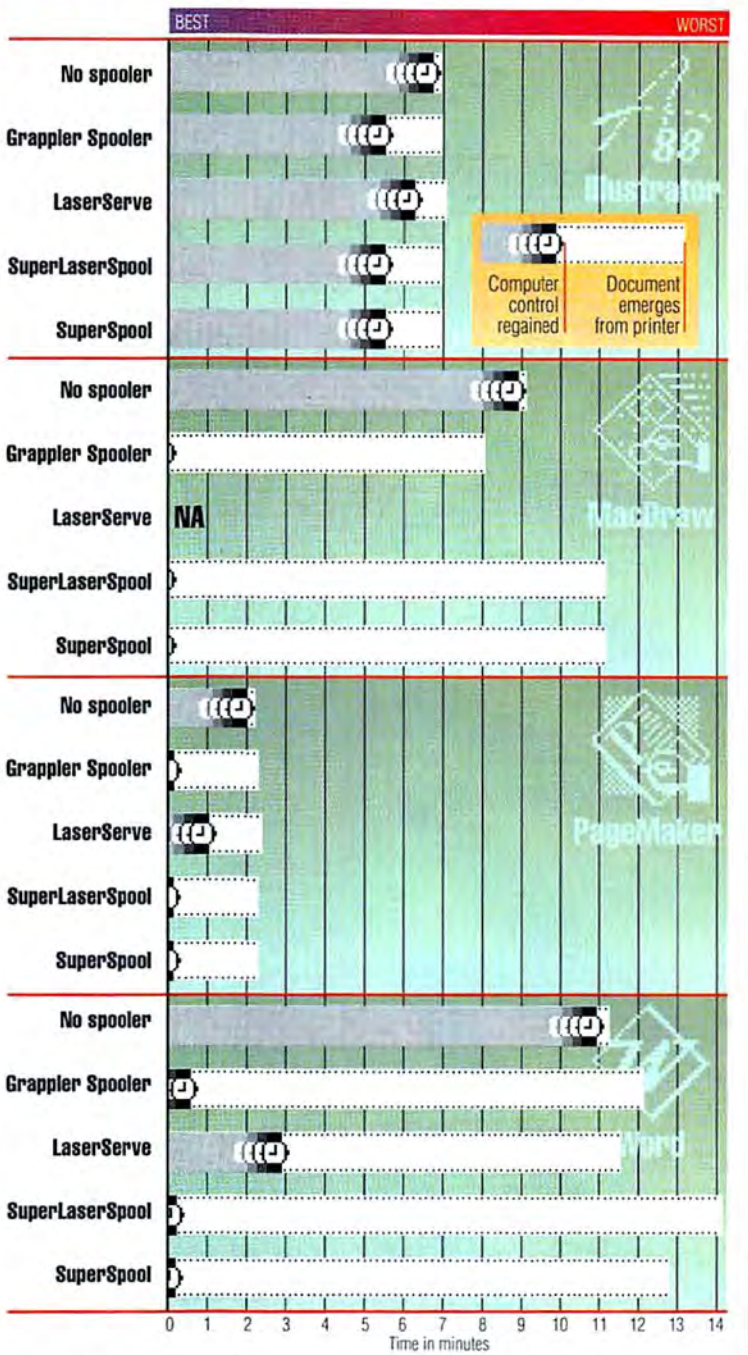
To evaluate real-world performance, we created four different types of documents: an Illustrator 88 document with one downloadable font; a complex MacDraw II document; a PageMaker document with TIFF, PICT, and bitmapped images, as well as a downloadable font; and a ten-page Word document. Each of these documents was first printed without a print spooler to an ImageWriter II and a LaserWriter IINTX. Then we printed the documents again using the print spoolers to see how much they helped. Our technicians started their

SuperSpool	TurboSpool
★★★½	★★½
5.0	1.0
$99.95	$129
90 days, 30-day guarantee	1 year
yes	no
no	no
no	yes
NA	no*
yes	yes
desk accessory	desk accessory
yes	no
no	no
no	yes
no	no
yes	no
vague	specific
none	none
SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (408) 245-2202	Peripheral Land Inc. 47421 Bayside Parkway Fremont, CA 94538 (800) 288-8754 (415) 657-2211

digital stopwatches when they clicked on OK in the print dialog box, hit the lap button when the wristwatch icon disappeared, and stopped timing when the final page of the test document emerged completely from the printer. The lap time indicates when control of the Mac is returned to you and is more important than the total printing time.

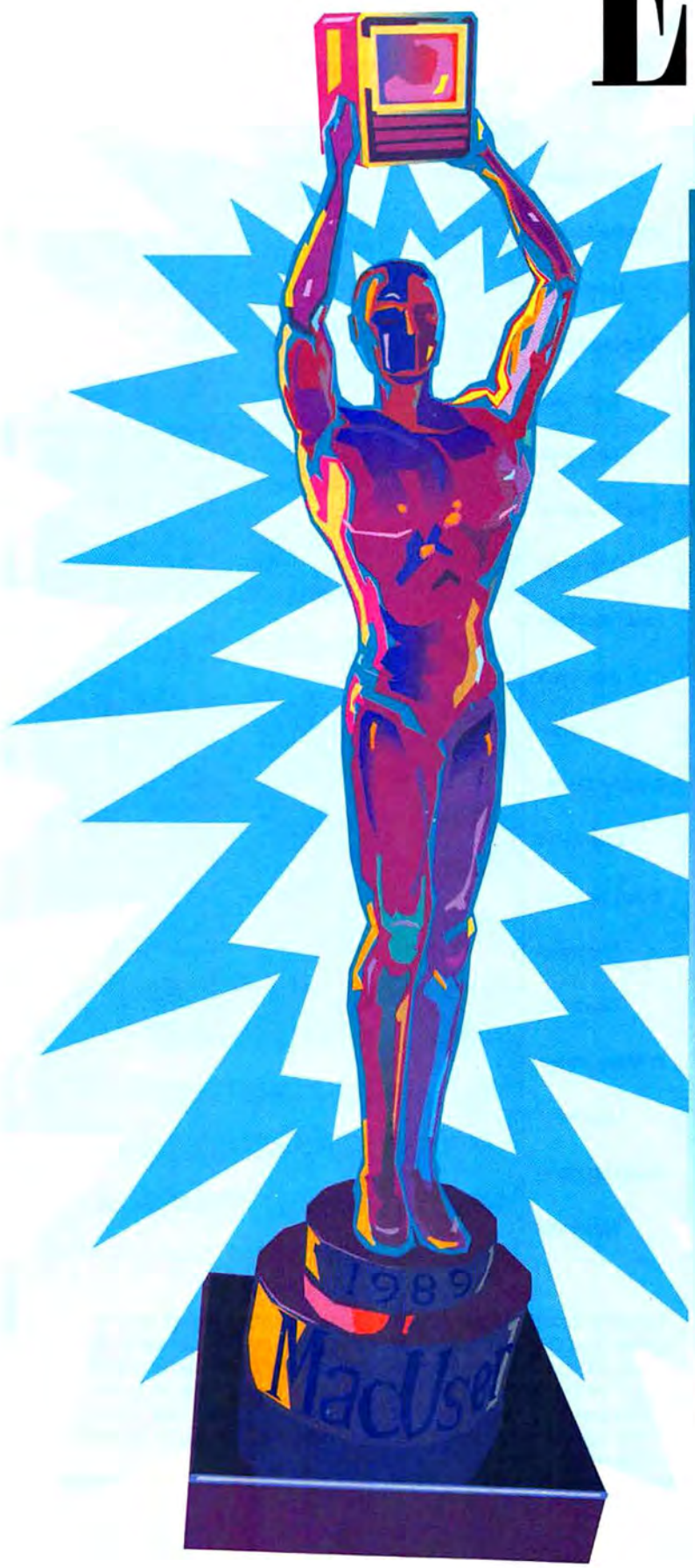
Since the ImageWriter is inherently slow — its meager 2K buffer quickly fills up with commands as it waits for the mechanical dot-matrix print head, causing commands to stack up inside the Mac — spoolers provide tremendous throughput improvements. As Figure 2 shows, the serial-ImageWriter spoolers (Grappler Spooler, SuperLaserSpool, and SuperSpool) all spooled our MacDraw II document, which normally takes 9 minutes to print, in less than 15 seconds. That's 36 times faster than without a spooler! (Our AppleTalk spooler, LaserServe, failed this test because it kept dropping its connection to the

Figure 2: ImageWriter Spoolers



Spoolers sometimes take longer to actually produce a page from the printer than when you print without a spooler, but they can return control of your Mac to you up to 36 times faster. SuperLaserSpool and SuperSpool are the consistent front-runners in this regard, with Grappler Spooler running a length behind. LaserServe, our only LaserTalk spooler, trailed considerably and kept dropping the connection to the ImageWriter during the MacDraw test.

Everybo



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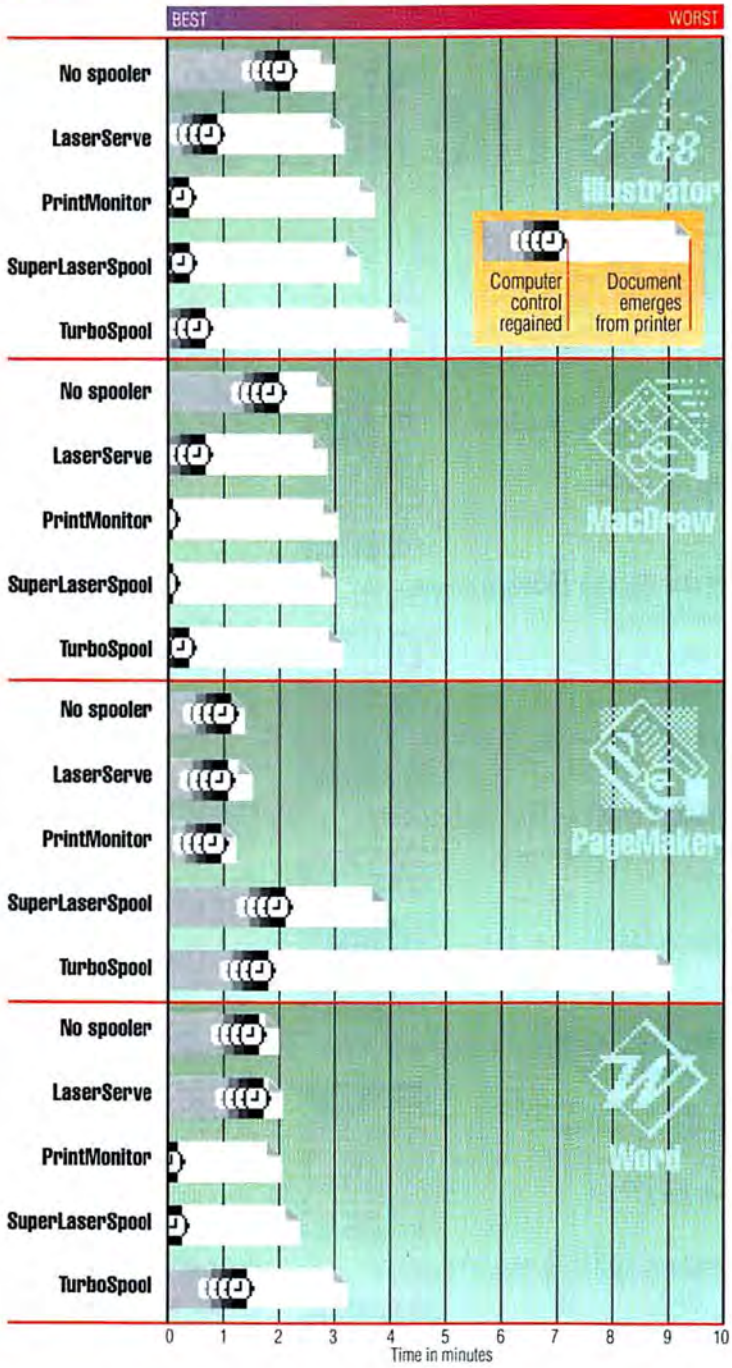
Sugg. Ret. $795



*This is a partial list of 1989 Eddy Award Winners.

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Figure 3: LaserWriter Spoolers



LaserWriter owners also benefit from print spoolers. PrintMonitor, a MultiFinder freebie that comes with Apple's system software, gives the pricey SuperLaserSpool a run for the money. LaserServe and TurboSpool both lag behind because they spool after the printer driver does its conversions, not before.

ImageWriter — because of time-outs — when working with MacDraw.)

We had equally impressive results spooling the ten-page Word document, although LaserServe again drew attention, this time because of its noticeably slow performance. The same was true for the PageMaker tests. And although all the spoolers showed only minor improvement over nonspooled printing in the Illustrator test, LaserServe was again the slowest. At first, we thought overhead from the AppleTalk protocol might be responsible for LaserServe's slowness, but SuperLaserSpool prints to AppleTalk ImageWriters as fast as it does to serially connected printers.

The LaserWriter spoolers also demonstrated impressive results (see Figure 3). Running neck and neck in every test except the one with the PageMaker document, PrintMonitor and SuperLaserSpool were the fastest overall — we regained control of the Mac seven times faster, on average, than without a spooler. The slower results of LaserServe and TurboSpool demonstrate the inferiority of spooling the PostScript output of the printer driver rather than the QuickDraw output of the application.

Regardless of how quickly a print spooler returns control to you, it's worthless if it degrades the performance of the foreground application so much that you can't get any work done. To test performance degradation, we recalculated an Excel 2.2 amortization spreadsheet while the spoolers handled the printing of our PageMaker document in the background, and we also tried typing at a normal speed in Word 4.0. With Grappler Spooler and LaserServe, the ImageWriter II stopped printing during the Excel recalculation. SuperLaserSpool and SuperSpool continued to print during the recalculation, but both the printer and the application slowed down noticeably.

Compute-intensive work slows the printing of LaserWriter documents too, but you don't notice any delay in getting hard copy since the LaserWriter ejects fully completed pages. The spreadsheet recalculation delays all the spoolers by approximately the same amount of time. In our subjective typing test, cursor movement seemed erratic and characters didn't appear on-screen immediately as typed, although they weren't lost, thanks to the keyboard buffer. In sum, spoolers really do let you get back to work with only slight performance degradation.

PageMaker Problems

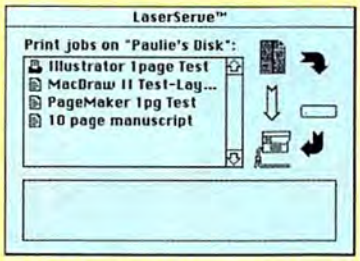
PageMaker throws a tough curve at most LaserWriter spoolers because it doesn't use the standard Laser Prep file. Instead, it uses Aldus Prep, which contains shortcuts and tricks for printing PageMaker files faster and more accurately. The four LaserWriter spoolers deal with this anomaly in different ways, with varying degrees of success.

LaserServe handles the prep-file switch just fine, but it doesn't offer any significant speed improvement over nonspooled printing when dealing with PageMaker documents. Nonetheless, since it doesn't slow you down in terms of regaining control of the Mac, as the others do, LaserServe is the best LaserWriter spooler for PageMaker users.

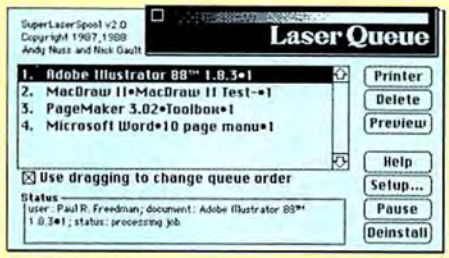
Even though our test results seem to indicate that PrintMonitor is slightly faster than LaserServe, there's something the bar chart doesn't fully explain. Specifically, when PrintMonitor senses a PageMaker document coming down the pike, it turns spooling off rather than get embroiled in the prep-file dilemma. As a result, when it comes to PageMaker documents, having PrintMonitor is like having no spooler at all.

As mentioned previously, SuperLaserSpool normally intercepts QuickDraw commands before they get to the printer driver. When dealing with PageMaker documents, however, it grabs the PostScript generated by the driver. Going this route is less efficient, and with our test

Figure 4: Face to Face

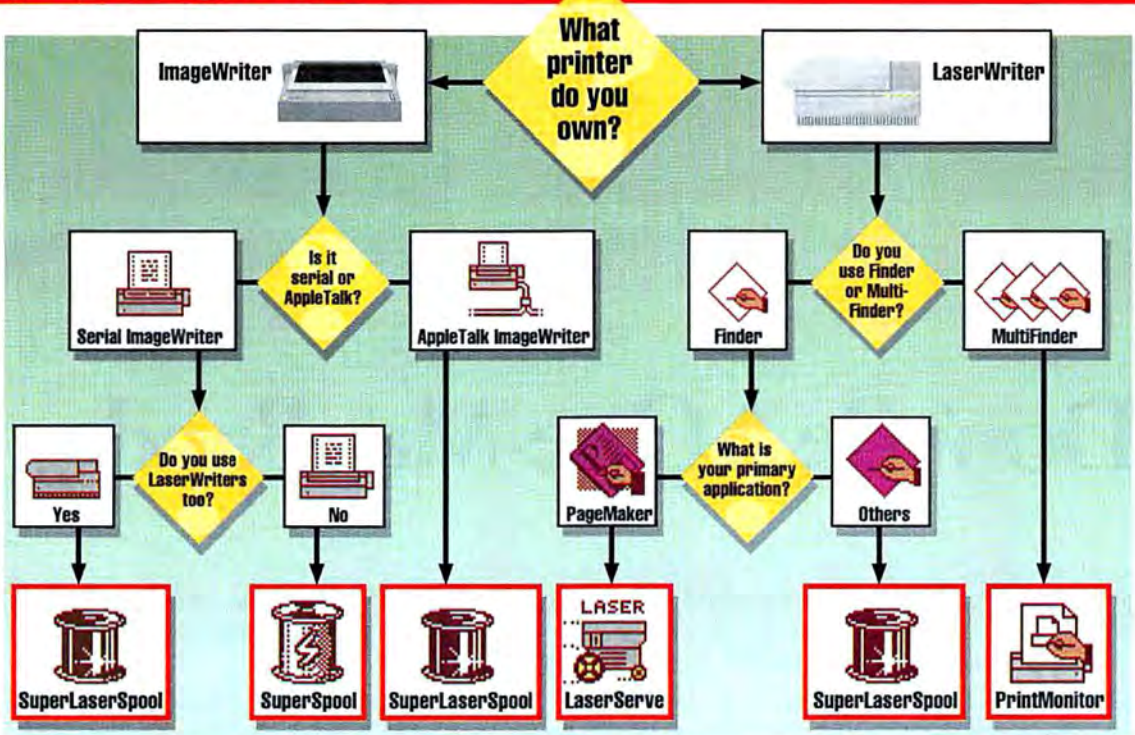


Poor Interface
Infosphere's LaserServe requires you to click on a confusing series of icons and arrows in order to control the spooler's functions.



Good Interface
SuperMac's SuperLaserSpool has a simple, intuitive interface that lets you select items in the queue and perform several operations simply by clicking on well-marked buttons.

Figure 5: Making the Choice



If speed is your primary concern, choosing the right spooler is easy. Ask yourself the questions in the diamonds, and follow the appropriate paths until you've reached our recommendations at the bottom of the decision tree.



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document it actually took longer to spool the document than to print without a spooler.

TurboSpool also takes longer to spool than to print, but that's because of an inferior spooling algorithm. More disturbing is the fact that TurboSpool forces you to manually download prep files whenever they're called for. It's exasperating that TurboSpool is smart enough to know it needs the prep file but isn't helpful enough to load it for you.

Easy Rider

Besides speed, the other important element of a spooler is its ease of use. Ideally, spoolers should work unobtrusively in the background, but there are instances when they require your attention. LaserServe, SuperLaserSpool, SuperSpool, and TurboSpool are all controlled through DAs, which makes them easy to find and quick to access. Grappler Spooler is a Control Panel device (cdev), and as such it is slightly more difficult to access. PrintMonitor is an application that runs only under MultiFinder and automatically launches itself in the background whenever it's needed. If you want to check on its progress, you can bring the print queue to the foreground.

Most of the spoolers are fairly easy to use and understand, but LaserServe's poorly conceived interface makes it stick out. To control LaserServe functions, you must click on a series of icons and arrows (see Figure 4). A given icon can be black, white, or dimmed, and you must remember what each state means. You must also be able to interpret the flow path to make sure the spooler is working the way you intend. This overuse of icons makes LaserServe more confusing and more difficult to work with than is necessary. Much better is SuperLaserSpool, with its simple, intuitive interface (see Figure 4). After selecting any item in the queue, you can perform several operations simply by clicking on well-marked buttons.

All the spoolers let you easily turn spooling on and off at any time. For example, with SuperLaserSpool or TurboSpool, you might choose to turn it off when printing PageMaker documents. All the spoolers also provide ways to manage documents in the print queue. You can delete or rearrange the order of documents to give priority to those you want printed first. PrintMonitor even lets you specify a delayed print time for less pressing documents.

SuperLaserSpool and SuperSpool let you preview most queued files. The Preview command is a quick way to check what the output will look like, without actually printing the document. This handy feature helps cut down on the paper wasted on printing proof copies. Unfortunately, you can't preview PageMaker or PostScript documents.

Err on the Side of Caution

No matter how careful you are, things can still go wrong when printing. And since spoolers distance you from the actual task of printing, it's imperative that they keep you abreast of problems. LaserServe does the best job of notifying you of printing errors. Alert boxes jump to the foreground to tell you specifically if the printer misfeeds, encounters a PostScript error, is out of paper, or drops off the network. TurboSpool also specifically identifies problems with alert boxes. The error alerts in Grappler Spooler and SuperSpool are a little more vague because the ImageWriter doesn't provide enough information to enable them to pinpoint the problem.

PrintMonitor and SuperLaserSpool don't use alert boxes. PrintMonitor has a little icon that flashes in the left-hand corner of the menu bar. Then you must bring the application to the foreground to see what the problem is. Similarly, SuperLaserSpool beeps if there's an error, and you must select the LaserQueue DA to determine what's wrong.

Why Wait?

Print spoolers take the drudgery out of printing by quickly returning control of your Mac to you. For normal use, print spoolers exact only a minimal price for the useful service they provide, and we think they should be in the software library of every Mac user. There's really no excuse not to get a spooler: Even if you're on a tight budget, you'll probably find that a print spooler will pay for itself by improving your productivity in a matter of months. You'll find our recommendations for the print spooler that is best suited to your particular needs in the "Bottom Line" sidebar.

Howard Bornstein has been writing about the Mac since "The Beginning" and is the author of *Turn & Burn — The Authoritative Guide to Falcon*, published by COMPUTE! Books.

The Bottom Line

If regaining control of the Mac is your primary concern, we recommend **SuperLaserSpool** for an ImageWriter II with the LocalTalk board installed. The only other spooler that works with AppleTalk ImageWriters is **LaserServe**, but it was consistently slower and kept dropping its connection to the printer from within MacDraw II.

For serial-ImageWriter owners, **Grappler Spooler**, SuperLaserSpool, and **SuperSpool** all provide similar performance increases. Grappler Spooler's cdev implementation is less convenient than the others' DAs, however. If all you use is an ImageWriter, then SuperSpool is for you. It's got most of the features of its big brother, SuperLaserSpool, but costs $50 less since it doesn't work with AppleTalk ImageWriters or LaserWriters. If your system configuration contains one of these printers in addition to a serial ImageWriter, then we recommend SuperLaserSpool.

For LaserWriter owners, the winner depends on your system and needs. **PrintMonitor** is one of the fastest spoolers, and it comes free with the Apple system software. The drawback is that it doesn't spool PageMaker documents and requires MultiFinder. For people who don't use MultiFinder, SuperLaserSpool is once again our choice. It's as fast as PrintMonitor and more convenient to use. If you use PageMaker a lot, however, this spooler doesn't cut the mustard, since spooling a PageMaker document with it takes longer than printing without a spooler.

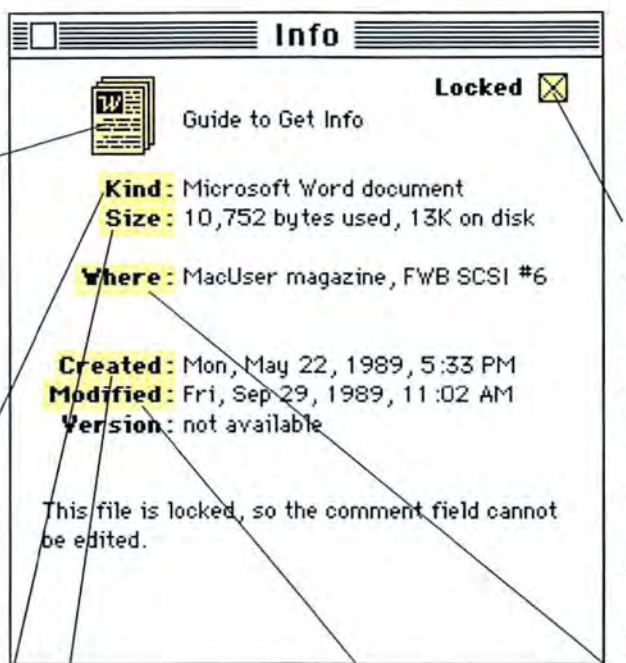
For diehard PageMaker users, LaserServe gets the nod because it doesn't slow you down when you're printing PageMaker documents, as the other spoolers do. Furthermore, it provides "plain English" alerts when printing errors occur. On the other hand, LaserServe has a confusing, idiosyncratic user interface. **TurboSpool** is just as fast and has a much nicer interface, but it forces you to manually load prep files instead of doing it for you. We were also put off by the fact that it sometimes delayed printing far beyond what we considered acceptable.

POWER TOOLS

EDITED BY JAMES BRADBURY

A Guide to Get Info

Managing memory starts with learning how to use Get Info. Here's a map to its hidden powers.



● **ICON:** The icon for the application or document you've selected. Document icons usually are customized so you can tell what application was used to create the document. Some documents, such as text or SYLK files, though, have generic icons.

Document icons reflect the application that created them even after the application itself has been removed from your disk. That's because the icons themselves are stored in the invisible Desktop file. If you rebuild the Desktop file, a generic icon rather than the application icon might appear until the next time you load the application.

● **KIND:** This field gives the same information that you get when you view a folder by name: Floppy and hard disks say *disk*, folders say *folder*, and application files *application*. Documents with a parent application currently present on the hard disk say *[name of application] document*. If the application is not currently on the disk, the field shows *document*. The information about the parent application of a document is lost if you delete the application and restart your Mac.

● **SIZE:** For files, this field tells you how much disk space a file is taking up. For folders, it tells you how much disk space the folder is using and how many files are in the folder — two useful bits of information that you can't get from the directory dialog box. For disks, the Size field tells you how much space is used on the disk and how many files are on it.

● **CREATED:** This field lists the day, month, year, and time a file or folder was created. Even if you change the name of the file or make a copy of it with the Finder's Duplicate command (Command-D), this original creation date doesn't change. If, however, you use the Save As option to create a new copy of the file *with a different name*, that file will have a brand-new creation date.

The creation date is sometimes useful for determining exactly which release of an application you're using. Software publishers don't always update version numbers every time they make a change in a program, so the creation date may be the only way to identify exactly which release you have.

● **MODIFIED:** This field is useful for determining which of two versions of a file is more up-to-date. Be careful, though: For folders, this date doesn't apply to changes made more than one level down. Thus, if Get Info says a folder was last modified on April 1, 1990, all you're guaranteed is that when you open the folder *the first level* inside it hasn't changed since that date. Changes made to files nested deeper in the folder don't affect the modified date.

The upshot? If you're backing up folders manually, don't rely on the last modified date for determining when the contents of a folder were last modified.

● **LOCKED:** By default, this box is unchecked. If you click on it, an *x* appears and the file is locked. If you click on it again, the *x* disappears and the file is unlocked. Folders can't be locked.

If a file is locked, you can't delete the file (or any folder containing it) by the usual method of dragging it to the Trash (unless you manually override by holding down the Option key).

Most applications let you change the locked file in memory, but you won't be able to save the changes to disk unless you create a new file with a new name. This feature is handy for protecting template files from accidental changes.

Some applications — notably HyperCard — won't let you make any changes at all to a locked file. The file becomes "read only."

The security provided by locking a file is very low-level — basically it only protects you from your own mistakes.

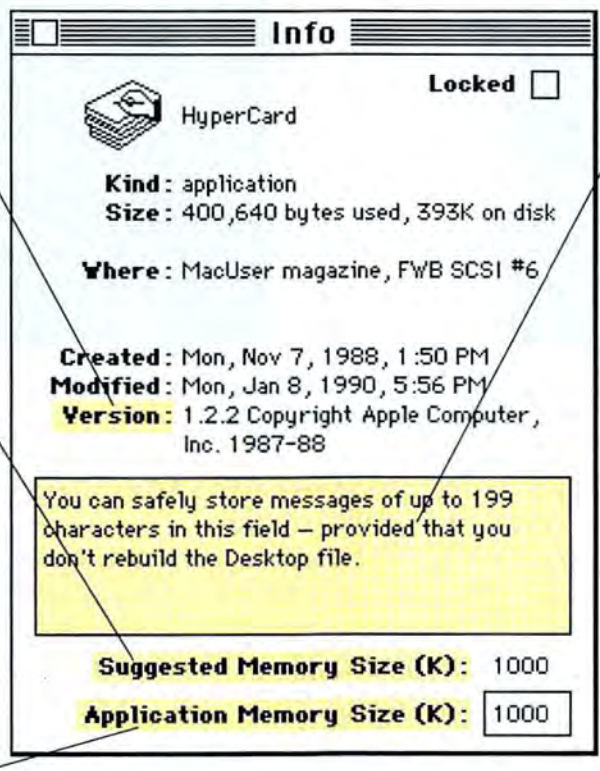
● **WHERE:** This field shows the name of the volume on which the file is stored. You may see information about the volume listed (depending on the driver software that was used to format it) as well as its SCSI ID number. This is a good way to check the SCSI ID of a device if you don't have a SCSI utility.



Tucked into the middle of the Finder's File menu is Get Info (Command-I), a command that delivers a boxful of information about any files, folders, or disks you've selected. Safer and easier to use than ResEdit, it gives you powerful access to certain file resources: You can speed file copying, optimize applications under MultiFinder, and grant yourself a little extra protection from making dumb mistakes. Here's a complete guide to using Get Info.

By Michele Stokol

Write to
Power Tools, c/o *MacUser*
950 Tower Lane, 18th Floor
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Send us your tips, questions, suggestions, and comments. We pay at least $25 for every idea and tip we use, and the Tip of the Month earns $100.



● **VERSION:** Every Mac application has a *resource fork*, which contains various program elements. One of these resources contains information on the application's name and version number. Until System 6.0, however, no easy way to view this information existed, so developers have only recently begun to consistently put useful information into the Version field.

● **SUGGESTED MEMORY SIZE:** How much memory — minimum — does a program need to run under MultiFinder? The answer is more complicated than it might appear. What you see here is what the publisher officially says is the minimum memory required to run the application under MultiFinder. You can always assign a program a greater slice of the RAM pie, but you shouldn't try to run it with less memory than is listed here.

● **APPLICATION MEMORY SIZE:** This user-modifiable field lets you change the amount of memory assigned to a program while it is running under MultiFinder. When you launch a program under MultiFinder, it claims a certain amount of RAM real estate as its own.

There's no correct answer to the question of how much memory an application needs. It depends on how much RAM you have to divvy up, what other applications you'll be using at the same time, and what demands you'll be placing on the application while you're using it. The best strategy is trial and error: Start out with the recommended amount (which should be the default setting anyway). If you find you're running out of memory at critical moments, start increasing the amount of memory by small increments until your problems cease or you run out of memory and have to buy more, whichever comes first.

Many people forget that the Finder itself is an application and that it can be assigned an amount of memory to be used under MultiFinder. The default is 160K, but in some situations — when you're using a large hard disk or a CD-ROM disc, for example — you might find yourself running out of Finder memory. Increasing the Finder memory to 256K not only solves that problem but also improves file-copying performance in general.

● **COMMENTS:** A user-modifiable field that may be most famous for the fact that its contents are lost whenever you rebuild the Desktop file. The Desktop file is where the Finder keeps track of which applications are installed, what their icons look like, and so on. Rebuilding it (which you can do by holding down the Option and Command keys while restarting your Mac, until you see the relevant dialog box) may improve performance slightly if the file is cluttered with outdated information for applications that no longer exist.

What goes into this field? Basically, anything that you or the software publisher want to put there. Microsoft, for example, puts ad copy for Excel into the comments box for that application. Whatever information you put here, though, make it pithy: The official limit for comments is 199 characters, and trying to write more than that might cause a crash. (Note: You can't modify the Comments field while a file is locked.)

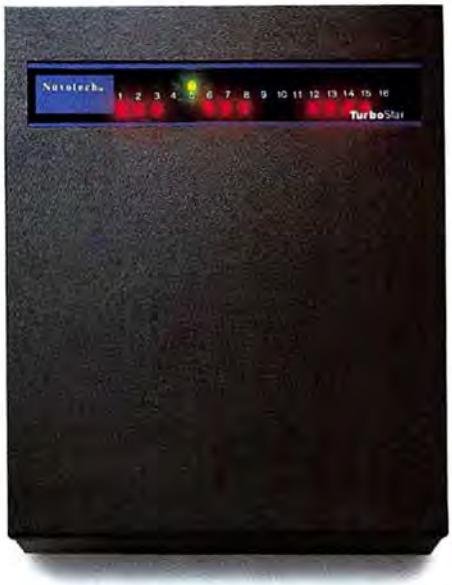
If you want to have your comments and rebuild your Desktop too, here are two options: DiskTop, from CE Software (1854 Fuller Road, P.O. Box 65580, West Des Moines, IA 50265; [515] 224-1995) has a feature that lets you rebuild the Desktop file without destroying comments. And a $10 shareware program called Comment Editor by Scott Armitage (available from CompuServe and other shareware sources) lets you create comments that are impervious to Desktop destruction.

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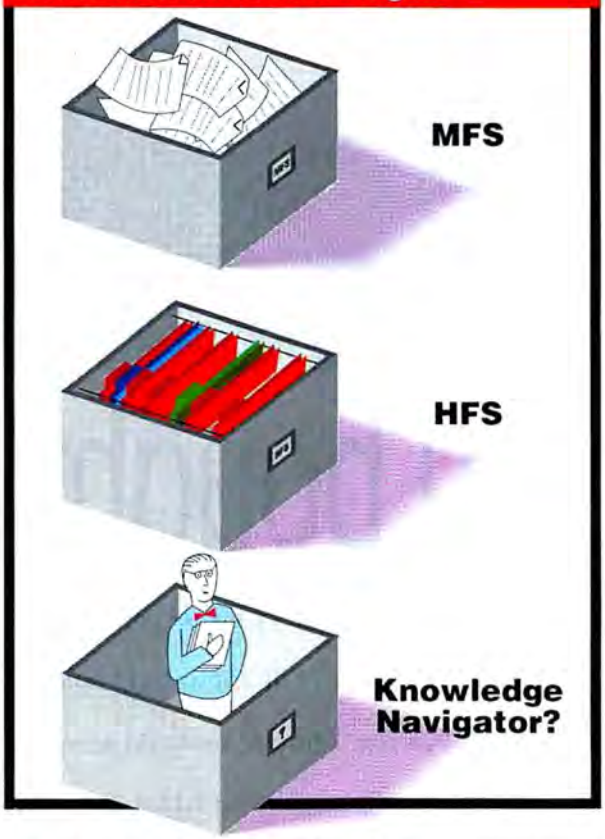
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HFS: Hard to Find Stuff

Once and Future File Managers



According to Apple, version 7 of the Macintosh operating-system software, which is scheduled for release some time this year, will include a Finder that actually finds. It will, in other words, do what Find File and other utilities have been able to do for some time.

A cynic would say that six years is a long time to wait for a program to work.

Since we're not cynics, let's just say that this is a good time for the release of a new Mac file-management system. The current technique for keeping track of files is becoming obsolete, what with the arrival of large hard disks and, even more, of CD-ROM drives with near-gigabyte capacities.

This isn't the first time that Apple has needed to rethink the way files are managed, and it's worth our while to recall what happened the last time it did, especially since parts of the original file system are still with us — and still causing problems. This recollection will also make it clear that the same tricks won't work twice.

If you bought one of the original Macs back in 1984, you got 128K of RAM, a 400K floppy-disk drive, and no hard-disk drive. You also got a program called Finder, the findingest part of which was a file-access system called Macintosh File System, or MFS. You soon discovered that 128K of RAM and one 400K floppy-disk drive were not enough, but you probably didn't have much trouble with MFS.

By Michael Swaine

Apple launched the Mac with MFS, a file-organization scheme with all the convenience and complexity of your sock drawer. HFS added real hierarchical folders, but today's massive storage devices already demand something more.

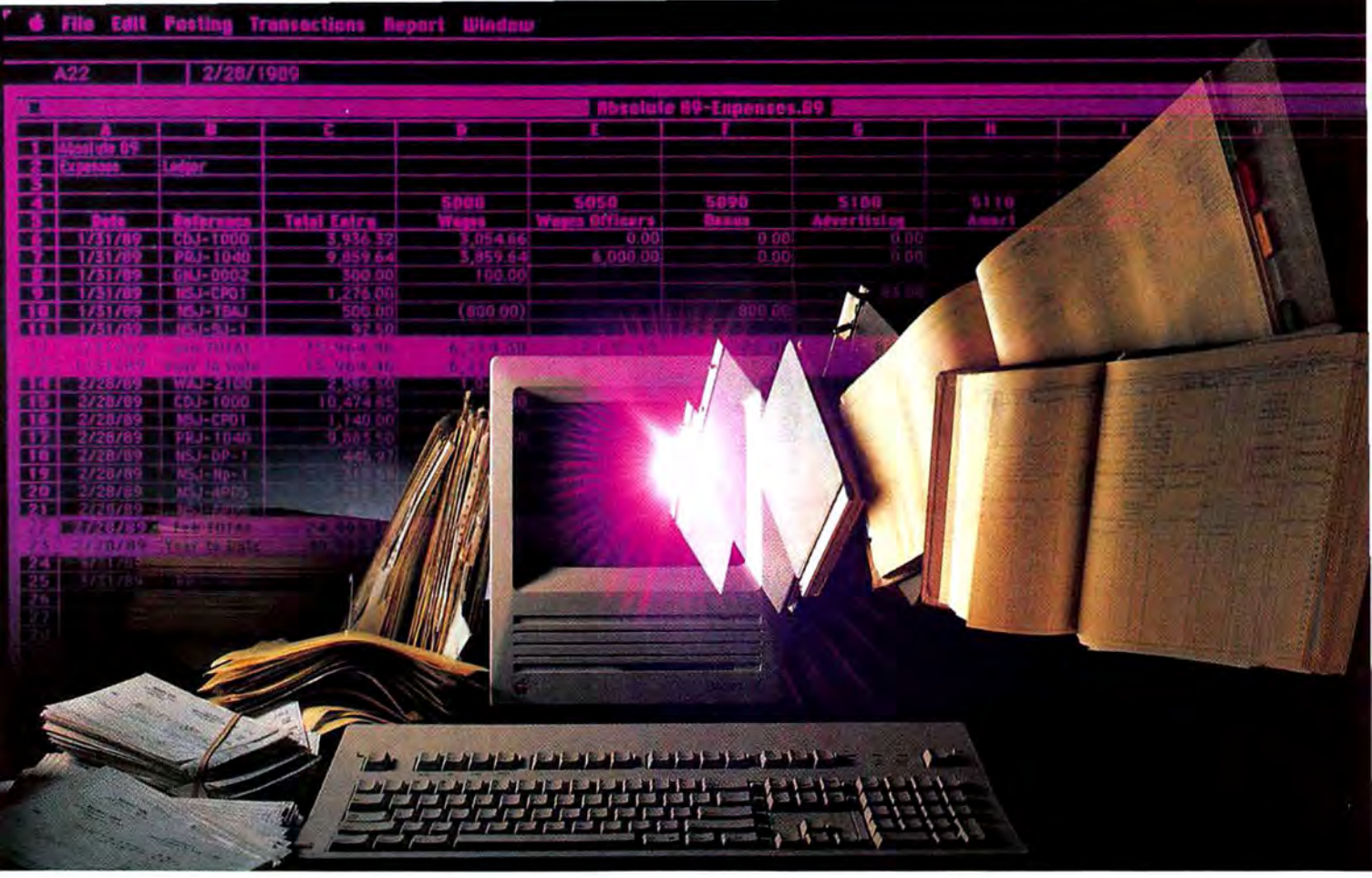
Given the number of files that you could put onto a 400K disk anyway, MFS was adequate for the job.

It's also worth remembering one humble feature of the Macintosh that made it easier than it had been to keep track of files: the 32-character filename limit. Most other computers of the day allowed a maximum of only 11 characters in a filename. The Macintosh's longer filename limit turned out to be more than just a quantitative improvement. It made a qualitative difference — the difference between cryptic codes and meaningful names, the difference between performing a decoding operation and recognizing a familiar name.

By the beginning of 1985, the RAM crunch was broken, and full support for SCSI devices appeared later that year, making it practical to attach a hard-disk drive to the Macintosh. As is often the case, the hackers got the technology before anyone else: In 1985 I had the privilege of publishing in *Dr. Dobb's Journal* the first do-it-yourself article on upgrading the Macintosh to 512K and the first article on interfacing a SCSI hard-disk drive. But real Mac users soon followed suit, obtaining this technology for themselves.

At this point, MFS began to be a problem, so Apple introduced its Hierarchical File System, or HFS. Under MFS, folders were only a cosmetic device — all files were maintained in a single list in an invisible file called Desktop. This meant that access time depended on the number of files on the disk and that you couldn't have two files with the same name on one disk. The standard file dialog box under MFS was just a scrolling list of all files on the disk; folders did not show up in the list.

HFS, however, creates a special file for each folder and keeps track of files within folders, still using an invisible file called Desktop. Access time under HFS depends only on the number of files in the relevant folder, two files can have the same name as long as they are in different folders, and the hierarchical structure of folders (as well as the folders themselves) shows up in standard file dialog boxes.



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(Jan. 1990 MacUser Magazine)

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HFS is a better file-management system for hard-disk drives; it's also better for the 800K and 1.4-megabyte floppy disks that Apple introduced. The virtues of HFS are reflected in its name: It's a hierarchical file system, and it's designed for managing files maintained in the hierarchical structures of folders.

But MFS is still around. The Format utility allows you to format a disk in the single-sided format; if you choose this option, Format uses MFS to do the job. This is sensible not only because it provides compatibility with older machines but also because MFS is an appropriate file format for small-capacity disks. It's probably even more appropriate today, since the average file is larger than it was in 1984, so you can't get as many of them onto a 400K disk.

Desktop is also still around, and that's not such good news. Desktop is generally viewed as the wrong tool for the job today. It was designed to work with MFS and it is very slow in dealing with large numbers of files. Desktop is likely to to be replaced by a better tool in version 7.

For an idea of what that tool might be like, take a look at the Desktop Manager file that AppleShare uses to keep track of files. Craig Danuloff and Deke McClelland suggest in their new book, *Encyclopedia Macintosh* (Alameda, California: SYBEX, 1990; $24.95), how you can bypass the Desktop file, using Desktop Manager today under System 6. The benefit will be faster screen redraws when returning to the Finder. All you have to do, they say, is to copy Desktop Manager into your System Folder. Apple, however, does not officially recommend this procedure.

A less radical technique for improving desktop performance is to occasionally rebuild the desktop by holding down the Command and Option keys while mounting the disk. The operation does take time, but it should speed file access overall on a disk that has been in use for some time. Unfortunately, Get Info comments about files are stored in the Desktop file, and these comments are destroyed by the rebuilding process. If that matters to you, look into CE Software's DiskTop, which has a feature for rebuilding the Desktop file without destroying comments.

We are now at a new watershed, and the problems that the next file-management system must deal with are more difficult than the ones that HFS was designed to solve. A hierarchical structure, implemented properly, makes it easier for both the user and the file system to deal with the complexity of a significant number of files. But HFS has proved to be inadequate from several perspectives in dealing with the information density of a large hard disk or CD-ROM disc.

First, it imposes too great a maintenance chore on the user. On the standard magnetic media that any file system must support efficiently, it is the user who must maintain the hierarchical structure, and that process is now getting out of hand. On a large hard disk, the user may have more folders to keep track of than MFS had files to manage on one of those 400K disks in 1984. Large hard disks *require* file-finding techniques that go beyond sifting through hierarchies of folders.

Second, a single hierarchy can't capture the complex structure of relationships among files that exists on a typical hard disk. If you often find that you're unsure where a given file is located on your hard disk, this doesn't necessarily mean you're disorganized. This is more a sign of a problem inherent in hierarchical

For an idea of what Desktop's replacement might be like, take a look at the Desktop Manager file that AppleShare uses to keep track of files.

Name That Quote

This month's puzzle is a simple one, presented as a cautionary note for anyone who believes that the transition to System 7 will be a smooth one. The first person to send the correct answer will receive an "I Beat the System" t-shirt.

Who offered the following optimistic advice, and where and when did he say it?:



"If you now own the standard 128K Mac, don't believe for an instant that your computer is obsolete. You may discover that you don't need the deluxe model. You may only need a second disk drive and software that uses techniques such as virtual memory . . ."



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ordering: Often, there are two or more equally logical places to put a file — a fact that made many a secretary or file clerk irreplaceable back in the days before computers. On a hard-disk drive, you may be able to search through the likely folders fairly quickly, but on a CD-ROM disc, opening folders to find a file is simply not a workable option. And on a CD-ROM disc, you're entirely at the mercy of the hierarchical ordering imposed by the developer. You need to have something like the Find File utility — but better, one hopes — to find files on a CD-ROM disc. CD-ROM discs *require* something like a criterion-search file system.

Third, a hierarchical file system, like any file system, provides no information about the content of files. Compared with the former 11-character limit, the long filenames that the Mac allows have definitely made it possible to remember the contents of more files, but names can tell you only so much. If you find that you sometimes need to open text files to see what they contain, this does not necessarily mean that you aren't doing a good job of assigning names to files. A name that was meaningful at the time when and in the context in which it was assigned may mean nothing to you at another time, in another context. This is almost certain to occur when you have hundreds or thousands of files to keep track of, as on a large hard disk or when the files were assigned names by someone else, as on a CD-ROM disc. CD-ROM discs *require* content-based file search.

I think that these three points show what sort of file system System 7 should have. It seems clear that the Macintosh file system of the 1990s should provide fast access to any file, should free users from having to maintain and search through complex hierarchies of folders, and should be based on search criteria rather than on arbitrary structures such as hierarchies of folders. It should also provide fast access to file contents and should search based on content.

System 7, even with its virtual memory, probably won't have all these features. It's not even clear that Apple can evolve Finder-based file access beyond hierarchies of folders without radically rethinking the point-and-click desktop metaphor. Utilities, of course, can take greater liberties with the user interface than the Finder can, and next month we'll look at some utilities that improve on the Finder's abilities to find.

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THE EXPERT'S EDGE

CD-ROM Is Still a Promise

By Thom Hogan

Last month *MacUser* ran lab tests on CD-ROM drives. This month you will find features on CD-ROM software and more. With all that coverage, you're probably beginning to think that CD-ROM "has arrived." I'm here to tell you that it ain't necessarily so.

Sure, some things have been released in CD-ROM format that perk your interest. And yes, the price of drives has declined to where $500 or so will get you a Macintosh-compatible unit — although even the fastest ones are still slow. And if you have a huge amount of data that you want to keep on-line, it won't cost your life savings to get that data mastered and pressed into CD-ROM format. All good signs, right?

I think not. CD-ROM has yet to develop in a way that ensures that what you buy today will be useful tomorrow. Moreover, there are hidden costs for those who jump into the game at this early stage. Let's start with the user end of things and work our way back to disc mastering to see why I say this.

Caveat User

Have you had a chance to look closely at any CD-ROM discs yet? No? Well, you're in for a big surprise. In fact, you're in for the same surprise you get every time you open a new HyperCard stack: There's no consensus on how CD-ROM software should look or work.

One of Apple's main reasons for jumping into the CD-ROM market two years ago was that it had what it believed was the ideal universal multimedia interface: HyperCard. Unfortunately, discs that use HyperCard as a database engine for CD-ROM data tend to suffer from the usual problems with HyperCard design: Every stack looks different from all others and works differently. Most I've seen carry this problem to excess: Buttons are scattered across the window in illogical and productivity-killing ways, and unless you perform a word search — which will seem to take forever, since HyperCard has to sift through as much as 650 megabytes of data on a drive that is slower than most hard drives — you're usually stuck with lookup tools that reflect someone else's view of the data.

Worse still, using HyperCard as the utility to pull data from a CD-ROM disc is a bad idea to begin with, even if we overlook the interface differences among data stacks. HyperCard eats up a 1-megabyte Mac's RAM space so fast you'd think that it was Cookie Monster discovering a lost cache of Oreos. That doesn't make sense to me. Maybe it makes sense to memory-chip manufacturers. The problem is that CD-ROM discs are rarely unified sets of applications. I want my CD-ROM disc to contain a good dictionary, hyphenator, almanac, encyclopedia, clip-art assortment, and photo bank, as well as a host of other reference works. I usually want to consult these works while I'm working in another program. So why dedicate one-fifth of my precious RAM space to a lookup engine?

Using HyperCard (or any stand-alone application) to access a CD-ROM disc also forces me to do a lot of extra manual work. For example, say I'm editing my newsletter in PageMaker and want to stick a picture of our pet iguana onto the page. The steps I *want* to be able to use are shown in "The Right Way" in Figure 1. Instead, what I *have* to do is use the HyperCard

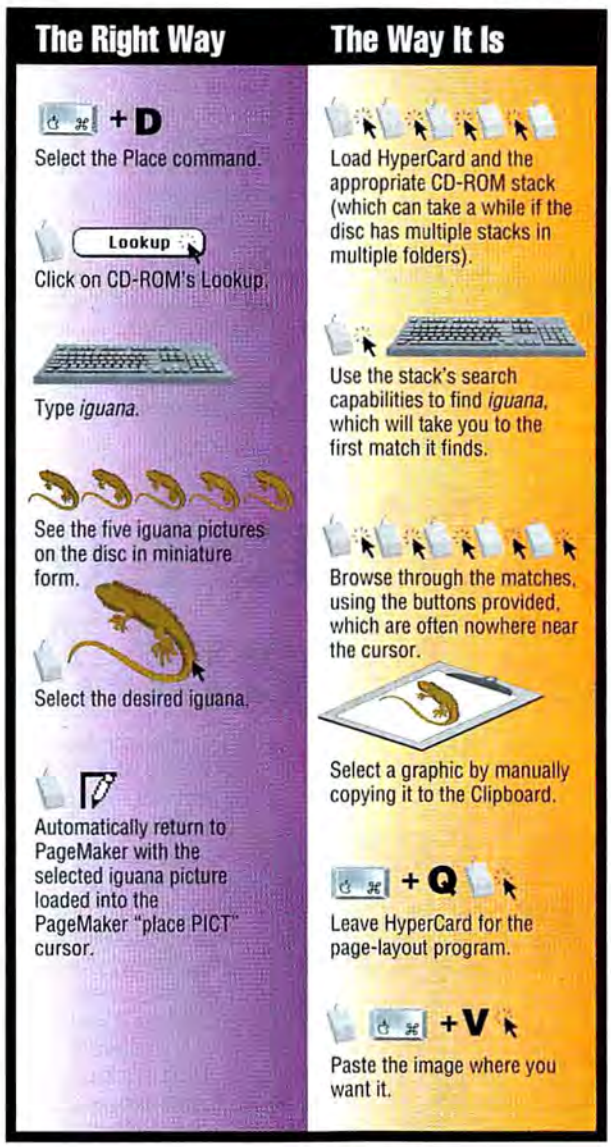


Figure 1: The race is on, but HyperCard's six steps are far too labor-intensive to make it a serious interface contender.

front end ("The Way It Is").

At first, it looks as if both scenarios have the same number of steps — six, right?

Sure, but I'll make you a little wager: Give me a product that works as described in my PageMaker scenario while you take a product that uses the HyperCard scenario. We'll use the same data disc to make things fair. All right — on your mark, get set, go! Ha, I finished first! Pay up, or else.

Know why I won? Because my six steps included only three mouse moves, three mouse clicks, the typing of one word, and one use of the Command key. Your six steps probably took at least 14 mouse moves, 13 mouse clicks, the typing of one word, and the use of three Command keys. Depending on how the stack was designed, it could have taken more. (Yes, I know someone's going to write to tell me how I can save a few mouse moves or clicks in this scenario, but I'm assuming we're working with an existing CD-ROM disc here.)

More HyperCard Headaches

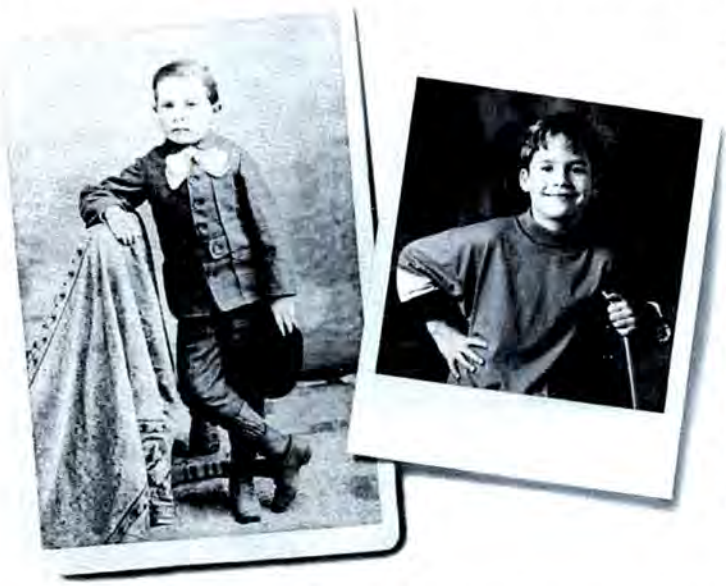
There are also subtle problems with using HyperCard to address CD-ROM discs. HyperCard doesn't understand PICT, TIFF, or EPSF files. It's not going to do me a lot of good with my iguana pictures, which were scanned from 35mm slides to TIFF. Indeed, the days of using MacPaint-style graphics are long gone for most of us, but that's all HyperCard understands.

If you think that pictures are the only problem, think again. My last two books consisted of nothing but reference tables (if you ever wondered what inspired me to design a table-making program, now you know). Microsoft Press, an ardent fan of CD-ROM, licensed the rights to create an electronic version of both books. But when it came time to stick the data onto a disc and create something that could look it up and display it, Microsoft Press ran into a simple little problem: Every table was different in structure and thus required an immense amount of human effort to design and fill. In the end, Microsoft Press didn't want to invest that kind of effort in something that might not return appreciable profits for some time to come.

I think you're starting to get the picture (HyperCard isn't in it), so I won't belabor my point any further. Suffice it to say that HyperCard is not the promised land as far as CD-ROM front ends go.

Many existing CD-ROM discs don't use HyperCard at all, but that doesn't mean they're any better. KnowledgeSet, for example, has been very successful in getting CD-ROM-disc producers to use its lookup engine, partly because it seems to search more quickly than HyperCard. I say *seems to* because it doesn't really search the entire disc when you enter a word to search for. Instead, the KnowledgeSet engine requires the disc's producer to perform a word concordance, which is then mapped to the documents on disc. In essence, KnowledgeSet preindexes the disc, resulting in faster lookups. The drawback is that as much as half of the disc's capacity may be devoted to

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index tables. Even worse, the KnowledgeSet engine was designed only for text handling — the disc maker is still stuck with tasks such as providing a user interface and picture-viewing capabilities. To KnowledgeSet's credit, its software does allow some very sophisticated search requests — "find all the references to *Thom* that are near the word *Macintosh*," for example. (Indeed, the more data you have access to, the more specific your search request should be. Otherwise you're liable to be overwhelmed with data, most of which you probably didn't want in the first place. Thus, CD-ROM software needs better searching abilities than HyperCard provides.)

If a disc designer chooses not to use HyperCard as the lookup engine for a work, another issue comes up: How to take advantage of the Mac's graphic interface. I've seen a couple of awful discs that simply throw Monaco type into a plain window. The reason for the Monaco type is that the data on the disc was never intended for the Macintosh's proportional-font viewing — Monaco characters are all the same width, so tabs and spacing in the original text are preserved as if the text had been typed on a manual typewriter.

Behind the Scenes

Which brings us to the issues behind the scenes, the issues that we developers must tackle but users rarely encounter (they just complain when we don't solve the problems correctly).

I have a goal of putting reams of material I've been gathering for years — including text, programs, charts, fonts, clip art, illustrations, and even photos — onto a CD-ROM disc or two. And I could probably afford to have the discs mastered (I've been offered deals of as little as $2,000 for the first 100 discs and $5 to $10 per disc thereafter). Collecting the data and getting the discs manufactured is not the problem. The problem lies between those two: organizing the data and creating a realistic interface for convenient access to it.

Getting Organized

Organizing the data doesn't sound like such a tough step, does it? Just create a few folders, stuff the data into the appropriate ones, and move on. Well, it isn't that simple. CD-ROM discs hold so much data that there's a distinct possibility that you'll run into the Mac's operating-system file limits if you just start throwing a bunch of 10K files together. Besides, finding data within folders within folders within folders can be difficult, no matter how well you've thought out the hierarchy. And, oh yes, you do have a blank 700-megabyte hard disk available to hold the data as you put it together for mastering, don't you?

The problems I pointed out in that last paragraph are just annoyances, though. If you didn't consider them before you started to put together your CD-ROM disc, you probably wasted a few days on them, but they didn't stop you dead in the water.

But let's take a disc of animal photographs I want to produce. Seems like a

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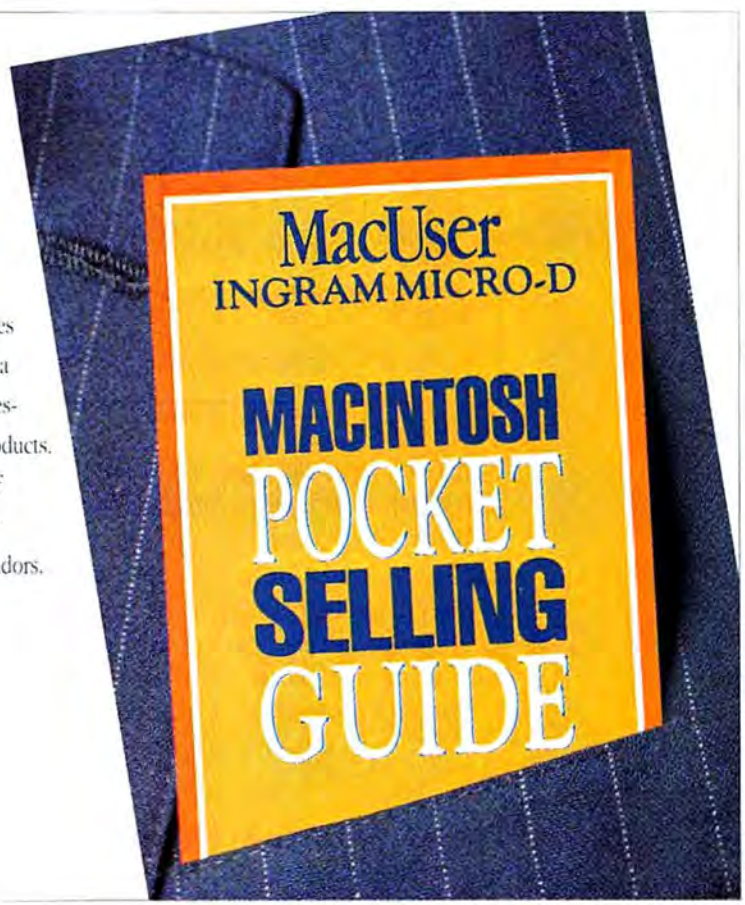
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THE EXPERT'S EDGE

simple chore, right? Each of my photographs probably averages 1 megabyte in size (in 24-bit color), so I ought to be able to stick 500 of them onto the CD-ROM disc. Five hundred files is easy to manage by creating a few folders (let's see, we'll have a reptiles folder, a mammals folder, a birds folder. . .). But do you see what's happening here? We're simply treating the CD-ROM disc as if it were a big hard disk.

This kind of multimedia disc *could* exist but doesn't — and nobody seems to know when it will.

What I want to do is index the images in as many ways as possible so that you don't have to browse manually to find what you want. I want to show you miniatures of the images that match (or closely match) your request. And why stop there? Maybe I'll throw in a brief description of the animal, where it's found, and maybe even information about how the photo was made. Sounds a bit like an extended version of Art Curator, SmartScrap, or Picture Base, doesn't it? Perhaps the companies that make these products will someday expand them in ways that will make them more useful for CD-ROM discs and offer other companies dedicated versions we can bundle with our product for a very low fee. Of course, that answers only the needs of picture-based CD-ROM discs — we haven't begun to explore all the things that would be necessary to combine pictures, sound, text, and other goodies into a sophisticated ever-ready reference. Then there's the small detail that this kind of multimedia disc *could* exist but doesn't — and nobody seems to know when it will.

In the meantime, if CD-ROM doesn't get rolling pretty soon, a host of other technologies are lined up waiting in the wings (Intel's DVI [Digital Video Interactive], offshoots of teleconferencing video, on-line services, and so on). That's OK, though, because that means I'll probably be able to recycle this column by changing the title to "DVI Is Still a Promise."

Hello, Programming

It's here — the day you write your first Mac application. In this month's installment, we re-create every C programmer's first program, Hello World.

Hello World is as simple as it sounds — the program opens a window and writes the string "Hello, world!" in it. But we'll use this simple example to demonstrate some fundamental concepts about Mac programming — namely fundamental data structures, screen organization, events, and manager initialization.

Before your Mac can say hello, it needs a window and an associated GrafPort in which to do it. The process of creating the window also sets up a GrafPort. Before you can use the GrafPort, you need to know a little more about the Mac's screen organization.

GrafPorts and Windows

A GrafPort is a Mac construct that provides a "world" in which the program can draw. The coordinates of this world are defined on an imaginary grid. The upper left corner of the screen is defined as the origin and is called location (0,0). A location in the Mac coordinate system is described by a *point*, which has a horizontal component and a vertical component. Values increase as a point moves down the screen and to the right — for example, the point (10,20) is 10 points to the right of and 20 points below the origin. The grid values range from –32,767 to +32,767 in either direction, so you can imagine there are more pixel locations off the screen than on. The monitor we're currently looking at has a resolution of 640 horizontal pixels by 480 vertical pixels.

When you write code, two coordinate systems, or "spaces," are of interest: global and local (see Figure 1). The global coordinate system is the one we've just described, with its origin anchored to the upper left corner of the screen. Windows such as the Finder's that are placed on the desktop are located in global space. The GrafPort that owns the global space is called the WMgrPort, and it is always accessible as a global variable from within your application, should you ever need it.

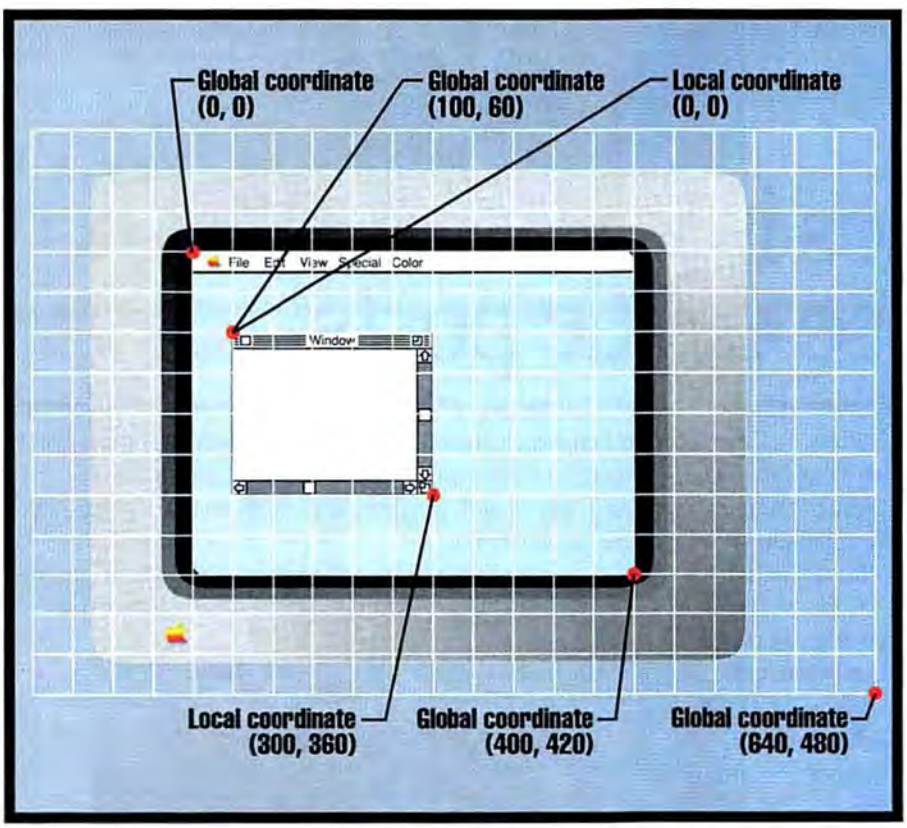


Figure 1: Global and local coordinate systems on the Mac.

A local coordinate system is always referenced relative to the window with which it's associated. You might say that a window owns its own GrafPort. The upper left corner of the content region of a window, just below the title bar, is the origin. All drawing in a window is specified in the local coordinate system. Depending on the location of the window in the global space, the drawing may or may not be visible on-screen.

`LocalToGlobal` converts point values in a window's local coordinate system to those of the global space. `GlobalToLocal`,

By Kurt W. G. Matthies and Thom Hogan



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Figure 2

```
NewWindow (wStorage: Ptr; boundsRect: Rect; title: Str255;
   visible: BOOLEAN; procID: Integer; behind: WindowPtr;
   goAwayFlag: BOOLEAN; refCon: LongInt) : WindowPtr;
```

however, works conversely. Next month, you'll learn how to move a window on the desktop and get a chance to see these Toolbox utilities in action.

We'll use the Window Manager call `NewWindow` to create a window. See Figure 2 (above) for the declaration of `NewWindow`, from the horse's mouth (*Inside Macintosh*).

This function has eight arguments! You can get the complete story for each argument from *Inside Macintosh*, but we want to add a few important comments. The first argument, `wStorage`, is a pointer to some memory to be used for the window record. In our simple example, it suffices to let the Window Manager allocate memory for us. `NewWindow` does this when it is passed a nil pointer for this argument.

The second `NewWindow` argument is a rectangle that specifies where to place the window in global space. Because of Pascal's parameter-passing conventions, you will have to pass this rectangle by reference.

The `title` field is defined as a `Str255` type, also known as a Pascal string. The first byte of a Pascal string contains the length of the string, followed by the characters of the string. Traditional C strings, such as the kind described by Kernighan and Ritchie, consist of characters followed by a terminating zero (see Figure 3).

As a convenience, the designers of THINK C invented a notation for quickly specifying Pascal-string constants: Strings that begin with the token `"\p"` are created as Pascal strings. For example, `"\pUntitled"` is compiled into the Pascal string that `NewWindow` interprets as `"Untitled"`. The compiler will, of course, still create standard null-terminated C strings if the `"\p"` is omitted.

We designed the function `initWindow()` (see Figure 4) to create the window for the application and return a pointer to it. Note the address-of operator (`&`) used to pass the bounding-rectangle parameter to both `SetRect` and `NewWindow`. Our window is 300 x 200 pixels and begins 40 pixels from the top and left edges of the screen. The `dBoxProc` window type is normally used for a dialog box and doesn't have a title, so we pass the nil Pascal-string constant, `"\p"`, for the `title` parameter. The `-1L` passed as the `behind` parameter tells the Window Manager to place this window on top of all the others, as per *Inside Macintosh*. If `NewWindow` returns a nonzero `WindowPtr`, it's passed to `SetPort`, making this window the current GrafPort — which is the port where all the subsequent drawing will occur. `WindowPtr` types are synonymous with `GrafPtr` types, so you can use them anywhere a `GrafPtr` is required.

Notice the programming style in Figure 4. The Macintosh programming world has adopted a convention whereby Mac constructs begin with a capital letter and include internal caps for readability — `WindowPtr`, `SetRect`, and `NewWindow`, for example. For clarity, we'll always begin the functions and variables we write with lowercase letters, so you'll know at a glance which functions are Toolbox calls and which are defined in the source code.

Figure 3

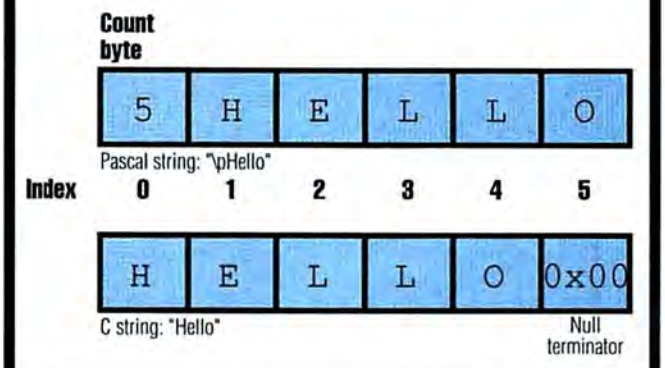


Figure 3: Given a character-string variable defined as char helloString[6], two string formats are possible.

GrafPorts and QuickDraw

Now that we have a GrafPort, we're ready to render "Hello, world!" Before we can draw the text, we have to move the pen to an appropriate place in the window. There's a member of the GrafPort structure named `portRect` that describes the port's rectangle in local coordinates. Given the window pointer, we get this rectangle with the `->` (pointer dereference operator), as follows:

```
windowRect =
theWindow->
portRect;
```

`sayHello()` draws the

Figure 4

```
WindowPtr
initWindow ()
{
    WindowPtr   w;
    Rect        windowRect;

    SetRect (&windowRect, 40, 40, 340, 240);    /* in global space */

    if (w = NewWindow (0L, &windowRect,"\p", true, dBoxProc, -1L, false, 0L))
        SetPort (w);

    return (w);

} /* initWindow */
```



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string centered in the window. We use `portRect` and the string width of our hello string, `kHelloString`, to calculate the starting pen position for our `DrawString`. The QuickDraw functions used here are `MoveTo`, which moves the pen location to the specified point in the current port; `StringWidth`, which returns the pixel width of the string; and `DrawString`, which draws text at the current pen location. All these functions are documented in detail in the QuickDraw section of Volume 1 of *Inside Macintosh*. Figure 5 includes the algorithm that calculates the starting point for drawing.

Figure 5

```
void
sayHello (WindowPtr theWindow)

{
    Rect    windowRect;
    Point   penLoc;

    /* get the center of the window */
    windowRect = theWindow->portRect;
    penLoc.h = (windowRect.left + windowRect.right) / 2;
    penLoc.v = (windowRect.top + windowRect.bottom) / 2;

    /* offset the pen's horizontal location by 1/2 the string width */
    penLoc.h -= StringWidth(kHelloString) / 2;

    MoveTo (penLoc.h, penLoc.v);

    DrawString (kHelloString);

} /* sayHello */
```

What if you wanted to write *Hello* and *world* in different fonts? A GrafPort maintains values for font, face, and size. `DrawString` always draws text using the port's current values. To draw the string in two different fonts, you'd have to split it, changing fonts between the words. The code would look something like that in Figure 6.

You might wonder why `MoveTo` was called only once in this example. Don't we have to relocate the pen before drawing the second word? Actually, `DrawString` moves the pen for us — when it draws a string, it moves the pen to a location following the last character.

Figure 6

```
TextFont (1);  /* font 1 is the application font (geneva) */

MoveTo (penLoc.h, penLoc.v);

DrawString ("Hello, ");

TextFont (0);  /* font 0 is the system font (chicago) */

DrawString ("world!");
```

Figure 7

```
void
getMouseDown ()
{
    EventRecord    eventRec;

    FlushEvents (everyEvent, 0); /* clear the event queue */

    /* our event loop runs until GetNextEvent returns nonzero */
    /* only mouse down events will be reported */
    while (!GetNextEvent (mDownMask, &eventRec));
}
```

Events

You may have read somewhere that the Mac uses an *event-driven* operating system. This terminology means that when a user clicks with the mouse, types a character, inserts a disk, or generates some other *event*, somehow your program is notified with a data structure for that event. The Mac understands many kinds of events, each corresponding to a real-world occurrence. Most applications idle in an *event loop*, which periodically checks the system *event queue* for new events and, when it finds them, acts on them accordingly. Our Hello World program looks for only one kind of event — a mouse click — before returning control to the Finder.

Events are *posted* to the event queue by the operating system. We're not concerned with the event queue — applications should always detect new events by using the routines of the Event Manager. We call the Event Manager procedure, `GetNextEvent`, in a loop to see if a new event has been posted for our application. If an event is available, `GetNextEvent` returns nonzero and fills an `EventRecord` with data describing the event. (We know we'll get mail about this, so to limit the outcry, we have to mention that the correct way to wait for an event is by calling `WaitNextEvent`. This procedure lets your application work with MultiFinder. Because we're not concerned with MultiFinder context switching during Hello World and because it's simpler to use, we use the lower-level toolbox call `GetNextEvent`). You pass an event mask and the address of an `EventRecord` to the function. The event mask informs `GetNextEvent` what events you're interested in. If you wanted to know about all events that occurred while the application was running, you'd pass the mask



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Hello World

```
/* ****************************************************************************
        FILE:           Hello.c

        DESCRIPTION:    Hello world source file.
                        Developed for our MacUser readers.

        AUTHOR:         Kurt W.G. Matthies

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        Revision History:
        ============================================================
        3/1/90   -      MacUser Release
        ============================================================

   **************************************************************************** */

#define                 kHelloString            "\pHello, world!"

/* ------------ Local Prototypes ------------------ */
void                    main                    ( void );
void                    initTheMac              ( void );
WindowPtr               initWindow              ( void );
void                    sayHello                ( WindowPtr );
void                    getMouseDown            ( void );

/* ---------------------------------------
        main -  program entry point
--------------------------------------- */
void
main ()
{
        WindowPtr       theWindow;

        initTheMac ();

        if (theWindow = initWindow ())
        {
                sayHello (theWindow);

                getMouseDown ();

                DisposeWindow (theWindow);
        }

        ExitToShell ();

} /* main */

/* ---------------------------------------
        initTheMac -    initialize the necessary managers for this to be a
                        stand-alone application
--------------------------------------- */
void
initTheMac ()
{
        InitGraf (&thePort);
        InitWindows ();
        InitFonts ();
        InitCursor ();
}
```



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Hello World, continued

```
/* ____________________________________
        initWindow -    initialize a window for this application; activate the
                        window and return the pointer to the window record
                        return 0L on fail
____________________________________ */
WindowPtr
initWindow ()
{
        WindowPtr       w;
        Rect            windowRect;

        SetRect (&windowRect, 40, 40, 340, 240);

        if (w = NewWindow (0L, &windowRect,"\p", true, dBoxProc, -1L, false, 0L))
                SetPort (w);

        return (w);

} /* initWindow */

/* ____________________________________
        sayHello -      print the hello world string in the center of theWindow
____________________________________ */
void
sayHello (WindowPtr theWindow)
{
        Rect            windowRect;
        Point           penLoc;

        /* get the center of the window */
        windowRect = theWindow->portRect;
        penLoc.h = (windowRect.left + windowRect.right) / 2;
        penLoc.v = (windowRect.top + windowRect.bottom) / 2;

        /* offset the pen's horizontal location by half the string width */
        penLoc.h -= StringWidth (kHelloString) / 2;

        MoveTo (penLoc.h, penLoc.v);

        DrawString (kHelloString);

} /* sayHello */

/* ____________________________________
        getMouseDown -  wait for a mouse-down event
____________________________________ */
void
getMouseDown ()
{
        EventRecord     eventRec;

        FlushEvents (everyEvent, 0); /* clear the event queue */

        /* idle until a mouse down */

        while (!GetNextEvent (mDownMask, &eventRec));
}

/* ============================== EOF ==============================*/
```

everyEvent. Hello World cares only about mouse-down events, so we pass mDownMask, as shown in Figure 7.

Before any program can run, you need to set up the necessary managers. Hello World requires initialization of QuickDraw and the Window and Font Managers (see Figure 8).

Figure 8

```
void
initTheMac ()
{
    InitGraf (&thePort);  /* thePort is global, defined by the system */
    InitWindows ();
    InitFonts ();
    InitCursor ();  /* sets up the arrow cursor */
}
```

Putting It All Together

The entry point of every C program is the function main(). Our main() pulls everything together — initializing the managers, opening the window, saying hello, waiting for a click, and cleaning up before it exits (see Figure 9).

It's important to note that the program's action routines are called if and only if a nonzero window pointer is returned from initWindow(). Drawing in an unspecified port causes unpredictable results. It's equally important that you don't dispose a nil WindowPtr with DisposeWindow; if you do, you'll see the dreaded bomb box. This gives us an opportunity to introduce some formal computerese: We can say that the program is *structured* to be *well behaved* (it doesn't crash) in the event of an *exception* (being unable to get memory for a window, for example).

That's Hello World. See "Relief for Sore Fingers" for information on how to get an electronic copy of the complete project. Once you have it in your Develop folder, double-click on the Project file. To run the application, first bring it up-to-date and then select Run. (Both Bring Up To Date and Run are selections in THINK C's Project menu.) Because Hello World is your first example, we chose not to confuse matters by introducing the Debugger. There's nothing to stop you from using it, and you'll learn how to configure the project for debugging in the THINK C *User's Manual*. We'll guide you through using the Debugger next month.

Try fooling around with the code. You might modify sayHello() to draw the hello string in a loop, changing the location of the pen inside the loop. Experiment with fonts, or change the text face, or perhaps try drawing some lines and

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Figure 9

```
void
main ()
{
    WindowPtr   theWindow;

    initTheMac ();

    if (theWindow = initWindow ())
    {
        sayHello (theWindow);

        getMouseDown ();

        DisposeWindow (theWindow);
    }

    ExitToShell ();

} /* main */
```

rectangles in the window. It's your program; don't be afraid to experiment.

The Programmer's Switch

Remember the little plastic bar that came with your Mac — the one you couldn't figure out a use for? It looks like some kind of high-tech paper clip, and it's called the programmer's switch. Think of it as a kind of panic button. Actually, it has two buttons. The one farthest from you switches control to the built-in ROM debugger, or TMON or MacsBug if they've been installed. The button closest to you reboots your system. New programmers have been known to experience some pretty strange Mac behavior, such as "machine gun" sounds or the video going wild. What's happening is that your program is writing to memory it shouldn't be writing to — probably with an errant or uninitialized pointer. The video and sound phenomena occur when you write nonsensical information into the video- or sound-buffer memory. Don't be too concerned about damaging your Mac — just use the switch to stop the process.

Next month, we'll begin a full-blown application named GenericApp. It will form the basis for a series we'll use to explore the Mac file system. Those of you who want to get a head start should study the Menu and Window Managers and learn a bit about resources. We'll be using ResEdit to create a project-resource file, and you'll learn how to read menus and manipulate windows on the desktop. Until then, happy coding.

Relief for Sore Fingers

You can get a copy of the C code for this program by logging on to CompuServe and typing GO MACUSER at any ! prompt. If you are not a CompuServe user, call (800) 848-8199 or (614) 457-8600 for more information on subscribing.

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HyperBASIC includes 30 XCMDs with source code to get you started. These XCMDs are very useful just as they are (they're even more useful than the ones you get in some XCMD packages), but you can use them as the basis for creating your monumental masterpiece.

And, HyperBASIC adds features which don't exist in HyperTalk, such as: multiway branching, case statements, arrays, and a variety of numeric data types, just to list a few.

HyperBASIC makes it easy for your XCMDs to communicate with your HyperCard application. A feature of HyperCard named CALLBACKS lets you send and receive information with the greatest of ease.

There are advanced features that enable you to make use of the Macintosh ROM routines. And for those who feel comfortable using a Debugger (like MacsBug), HyperBASIC will generate an assembler listing of your XCMD as well as insert MacsBug symbols to ease the task of debugging those big, complex XCMDs.

So, if you've been looking for the right XCMD, and you've come to the conclusion that you have to do it yourself, get HyperBASIC. At $99.00, you won't sweat over the price either.

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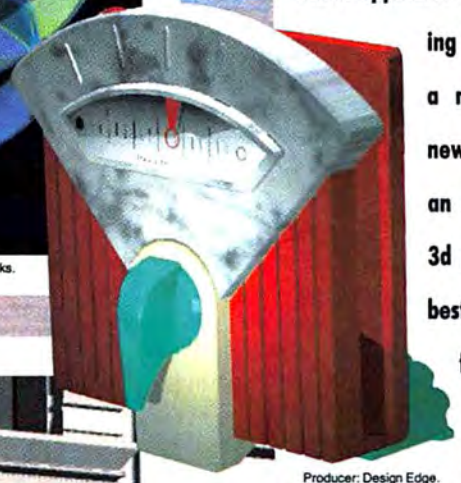
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TIP SHEET

Tip Sheet

Readers Share Their Tips and Tricks

Finder

Did you know that you can run Macs from the SE and II families with a real live co-pilot at your side? Just have your nearest Mac expert bring a second keyboard (and mouse) to your desk and plug it into one of the Apple Desktop Bus (ADB) ports on the back of your Mac.

The extra keyboard and mouse turn your Macintosh into a state-of-the-art training system, complete with room for a copilot. Your resident expert can sit beside you and demonstrate various techniques. This gives you the chance to try out the techniques yourself without having to share the keyboard or mouse (see Figure 1).

Art Serabian
Clovis, CA

[*Make sure your Macintosh is turned off before you connect or disconnect any keyboard. Otherwise you risk frying your Mac. — Ed.*]

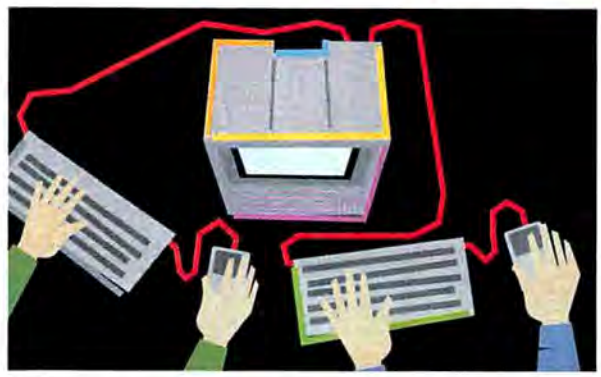


Figure 1: A two-mice tip: Training can occur side by side if you plug two keyboards and mice into one Mac.

Here's a way to stop people from pirating applications from a hard disk or a network:

First, create a blank document with the application you want to protect and give it a name similar to that of the application (such as "Word 4" for Microsoft Word 4.0).

Next, use ResEdit to make the program invisible (highlight the application name, choose Get Info from ResEdit's File menu, and click on the Invisible box). Quit ResEdit and restart.

You can now use the document you created to open the invisible application, but the application file itself can no longer be copied. Just make sure you save the opened file under a new name so you don't overwrite the original. You can also open the application by double-clicking on any other document you have created with that application.

Zhava L. Glaser
San Francisco, CA

Tip of the Month

Viewing folders organized by name instead of by large icon lets you see more files at a time, arranged in alphabetical order, without having to scroll. Unfortunately, when you view folders by name, you lose the title-bar information on the window that lets you see how much space you've used on your hard disk. To see this title bar, you've got to temporarily switch back to viewing your folders by icon.

Here's a simple solution that lets you have it both ways. First, create a folder called Disk Space. Open the folder, set it to View by Icon, and then shrink it to the smallest possible size that still shows the title bar. Now move the window to the bottom of the screen, so that only the title bar and space information show (see Figure 2). Since everything you want to know is at the top of the window, the status display is pretty small and can go in the lower-left corner of the desktop.

If that takes up too much room, move the window until the only thing that shows is the zoom box. One click snaps the window to full size, complete with disk-space information. Another click, and it returns to its corner.

Michael A. Alderete
Berkeley, CA

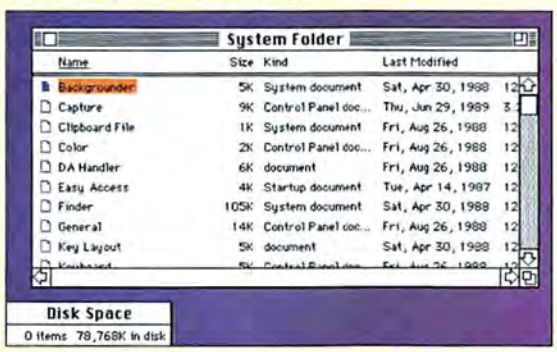


Figure 2: You can view your folders by name while still keeping an eye on available disk space by creating a tiny window and tucking it into one corner of your desktop.

Adobe Type Manager

Here's a tip about Adobe Type Manager (ATM) that's not mentioned in the product manual:

ATM gives non-PostScript printers such as the ImageWriter and LaserWriter IISC the ability to print Adobe's PostScript fonts. The package includes the PostScript outline fonts for the four "basic" fonts as well as the corresponding bit-mapped fonts: Helvetica, Times, Courier, and Symbol.

If you have little need for math and Greek characters, you might be tempted to save

Compiled by Gregory Wasson

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disk space by not installing the Symbol font. But when you try to print one of the 18 characters (see below) that are also included in the other three fonts, you'll find that they print with a bad case of the jaggies.

≤≥±≠≈√∫∞¬
∂πμΔΠΣΩ◊

It turns out these characters are represented in the Helvetica, Times, and Courier PostScript files only by references to their locations in the Symbol font. Without Symbol available, your Macintosh has no choice but to print the bit maps instead. If you want decent output for any of these characters, you must install the Symbol font — both the outline fonts and the bit-mapped font.

Douglas G. Miles
Ellensburg, WA

Excel

If you use charts a lot and like to use custom chart formats built from those already available, this tip will make your charting chores more palatable.

You can store libraries of custom chart formats, instead of re-creating a custom format every time you need it. Simply use the Clear command to empty the formulas of a chart with a format you find particularly useful, and use Save As to store it to disk.

To use your custom chart format, copy the data from the worksheet that you want to see in the chart and use Paste Special to paste the formulas into the formatted chart window. You now have the data illustrated in your custom chart format, without spending an hour or so to re-create that custom format.

If you encounter a situation where you can't copy the data directly (a discontinuous selection, for example), select the data you want charted and create a new chart file. Then open your customized chart file. Do a Select Chart on the customized chart file, use the Copy command, and then switch to the new chart file. Use Paste Special to paste the format of your customized chart file onto the new chart file.

Craig Tierney
Cobleskill, NY

Reflex Plus

One of the more annoying things about using Reflex Plus is having to take several extra steps when sorting on a field that hasn't been expressly included in a report. For instance, to make a neater label, you might concatenate a last-name and a first-name field [First_Name&" "&Last Name]. As long as you're in the report, however, you won't be able to sort by the last name.

The simplest solution is to create a last-name field and hide it. You make room for it by making it a tiny size (such as 6-point Helvetica), shortening it as much as possible, and tucking it in some uncluttered corner of the report window (keeping it in its proper repeating collection if necessary). Make the last-name field invisible by adding a carriage return with the CHAR function to its formula [CHAR(13)&Last_Name] so the field will show a blank spot and yet still sort correctly.

This method also works well if you want to search by zip code when you've lost it in a field formula such as: [City&" "&State&" "&State&" "&Zip].

Jesse Tharin
Tucson, AZ

Word 4.0

Whenever you double-click on a plain-text MacWrite document (such as the documentation files you download frequently from bulletin boards), it won't open unless you have MacWrite on your disk. As a lot more people use Word 4.0 than MacWrite,

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TIP SHEET

here's a way to make Word 4.0 automatically open those MacWrite documents in its own format when you double-click on them.

First, make a backup copy of MacWrite (if you have it installed) on a floppy and then delete it from your hard drive.

Next, make a duplicate copy of Word 4.0 on the hard drive and rename it MacWord.

By using ResEdit, you can change the Creator of MacWord from MSWD to MACA (highlight MacWord and choose Get Info from the File menu). Make the changes in the Creator box.

Now, when you double-click on a MacWrite document, MacWord will launch and the document will be converted automatically.

Hari Wiguna
Lincoln, NE

Word 4.0

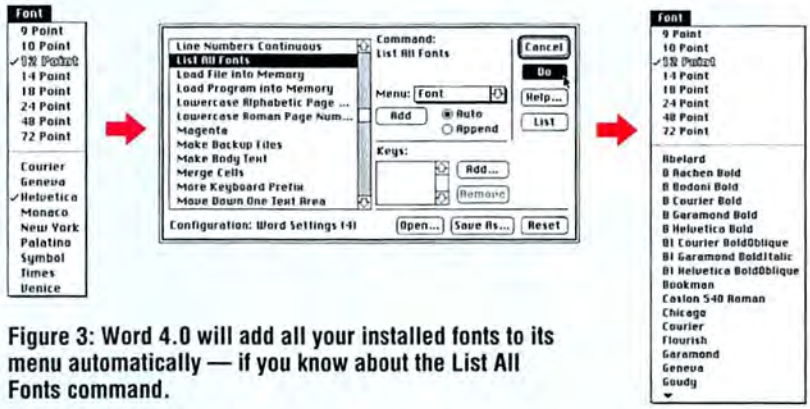


Figure 3: Word 4.0 will add all your installed fonts to its menu automatically — if you know about the List All Fonts command.

If you need to add font names to Word 4.0's Font menu, pressing Command-Option-+ each time can get tedious in a hurry. Here's a fast, undocumented way to add all the currently installed fonts to your menu.

Choose Commands from Word's Edit menu, and choose List All Fonts from the list of commands. Then click on the Do button (see Figure 3).

The menu bar will flash as Word adds suitcase fonts one at a time to the Font menu.

Glenn Worthman
Palo Alto, CA

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Help Folder

Answers to Readers' Questions

Is your Mac sick? Need a diagnosis? Leave it up to the doctor — Bob LeVitus. He's the author of Dr. Macintosh: Tips, Techniques and Advice on Mastering the Macintosh, *and the former editor-in-chief of* MACazine. *Now he's also the guy who answers your questions in this space every month.*

ATM versus Word 4

Q. I have never cared for the jagged output of my ImageWriter II, so when Adobe Type Manager (ATM) was released, I expected it to be the answer to my prayers.

What I got instead were beautifully formed characters — with rather eccentric spacing. It turns out that Microsoft Word, which is my primary word-processing program, doesn't support fractional spacing, except in LaserWriter mode.

Is there a way to fool Word into believing my ImageWriter is a PostScript laser printer? Or do I have to wait until either Adobe or Microsoft figures out a solution?

Linda Miller
North Hollywood, CA

A. There is a patch — a set of modifications to Word — that allows for fractional font widths on ImageWriters. It's called WORD4MOD.SIT. (It should be available from the usual shareware outlets such as user-group libraries, BBSs, and so on. I found it on CompuServe, where it's called WORDMO.BIN in the Macintosh Productivity Forum's word-processing library.)

Installing the patch requires familiarity with ResEdit (available from the same outlets). Obligatory ResEdit warning: Never use ResEdit on an original or master of anything. Always work on a copy. And don't forget to lock your master disks. That way, if you happen to make a mistake and damage something, you can always make a fresh copy from the master disk.

Recovering Word Temp Files

Q. I recently had a momentary power outage while working on a Word 4 document that cost me about half an hour's work. Yes, I know — I should have been saving my document paragraph by paragraph — but I hadn't. As this happened the night before I was to give a big speech, I didn't want to lose some of my best ideas, so I decided to try to recover them.

I looked in the System Folder, and there were two welcome-looking Word Temp files. Since I know Word throws these files in for some purpose, I figured they might contain my precious paragraphs. But I couldn't open them. I got a message about "trying from the application" but when I opened Word and tried to find the Temp files, they didn't show up in the dialog box.

I also searched the Word manual and the new System manual, but could find no mention of Temp files in either one.

Was my lost work in there anywhere? Can Temp files be opened? What about Excel.Resume files?

J. Preb Stritter
Randolph, VT

A. The following technique doesn't always work, so don't use it as a substitute for saving frequently or for backing up your work. But if your system has crashed and you want to try recovering a Word Temp file, you can try opening it by holding down the Shift key and choosing Open Any File from Word's File menu. That should enable you to open the Temp file (try the one with the highest number). If you want to, you can add the Open Any File command to your menu permanently by using Word's Commands option, which you'll find on the Edit menu.

Excel's Resume files are completely different — they provide a way to open a group of files by double-clicking on a single icon. When working in Excel with a bunch of files open, select the Save Workspace command from the File menu. (You must be in the Full Menus mode.) This creates a file called Resume. When you double-click on Resume, all the files that were

Two-Monitor Blues

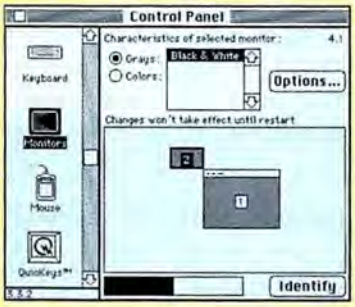


Figure 1: To keep from losing your cursor when using two monitors, use the Monitor cdev to position the screens so they touch only at the corners.

Q. I have a Mac II with two video cards and two monitors: a two-page monochrome monitor that I use when making architectural drawings and page layouts, and a 13-inch color monitor that I use with communications programs, short letters, spreadsheets, and games. I don't need to use both screens at once, and moving the menu bar back and forth and restarting the machines is a drag. If I leave one screen turned off, the cursor gets lost on the inactive screen. Is there an easy way to turn on and use one screen at a time?

John Black Lee
New Canaan, CT

A. Well, there's no easy way to turn on and use only one screen at a time, but you can do something to keep from losing your cursor. This bit of advice comes from the Radius Two-Page Display *User's Manual* for my SE/30, but it makes sense for anyone using two monitors.

Radius says: "Since you cannot disable the SE/30 screen, we recommend positioning the monitors in the Monitors Control Panel so they only 'touch' at the corners. This will reduce the possibility of the cursor crossing over to the SE/30 screen and therefore becoming difficult to locate." (See Figure 1.)

By Bob LeVitus

No Space for Fonts

Q. Is there any way I can avoid having to copy all my Image Club font files from the Letterpress CD-ROM into my System Folder in order to use them? The space on my hard disk is at a premium, and loading the bit maps with Font/DA Mover is so time-consuming.

Patrick Dungan
Victoria, BC, Canada

A. You need Suitcase II (from 5th Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; [504] 291-7221; $79) or MasterJuggler (from AlSoft, Box 927, Spring, TX 77383; [713] 353-4090; $89.95). They're both top-notch utilities. You can use either of them to access the bit-mapped (screen) font without having to install it with Font/DA Mover. Then, as long as the printer (downloadable) font and the screen font are in the same folder, your font will be automatically downloaded to the printer.

Make sure your CD-ROM player is connected and the Letterpress disk is inserted, and you'll be able to use Image Club fonts without copying anything to your hard disk or wasting time with Font/DA Mover.

Print PostScript to Disk Slip

Q. In the November '89 Help Folder, you answered a question about PostScript. You stated that it was possible to "capture the PostScript information that goes to the LaserWriter. Typing Command-K while clicking on the OK button in the Print dialog box of any Mac application saves the PostScript output in a text file called PostScript 0."

This is exactly what I would like to do, but it doesn't work, at least not in any application I have tried.

Earle D. Jones
Seoul, Korea

A. The answer should have open when you selected Save Workspace are opened as a group.

Making Cents and Fractions

Q. I generally use my Macintosh for word processing and some light DTP. I can't find any keys for fractions or the cents symbol. Instead, I have to type *1/2* or *$.05*. Even my cheapo portable typewriter has a dedicated key for 1/2 and 1/4 and a cent symbol over the 6 key. With all those unused Option-key combinations, where are these often-used

said to type Command-K *after* you click on OK (or press Return), not *while* you're clicking it. Hold the keys down until the cursor comes back. Also, this technique uses the LaserWriter printer driver, so make sure the LaserWriter icon is selected in the Chooser before you try it.



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and much-needed symbols?

Steven Shmerler
New York, NY

A. In most fonts, you can get the cent symbol by typing Option-4. Many useful characters are hidden from view, accessible only when you hold down the Option key: ™ (Option-2), ® (Option-r), © (Option-g), and √ (Option-v) are a few I use occasionally. If you're not familiar with them, use the Key Caps DA to explore. Just select Key Caps from the Apple menu, choose a font, and then hold down the Option key. Also, try holding down the Option and Shift keys in Key Caps — some fonts reveal additional hidden characters when you hold down the Shift key.

Fractions aren't quite so easy. The Macintosh has no built-in solution. So you need a font that allows you to type fractions. A good choice for low-resolution printers is the Fabulous Fractions font — a shareware screen font (available from the usual shareware outlets). It looks like Geneva, and fractions typed with it line up with other text in the Geneva font. If you pay the $10 shareware fee, you'll also receive a version that matches Apple's New York font.

If you need higher resolution, try the Bullets & Boxes PostScript font from Caseys' Page Mill (6528 S. Oneida Court, Englewood, CO 80111; [303] 220-1463), which has four kerning slashes for fraction building. The font offers more than flexible fraction making, though — Bullets & Boxes is one of the most useful collections of PostScript symbols around. It features eight sizes of round and square bullets and ballot boxes, the Command-key symbol, arrows, filled and open triangles, octagons, and diamonds.

For more ways to squeeze fractions out of a Mac, see "Fear of Fractions," in this month's DTP section. Regardless of what program you're using, you should be able to find a solution.

Flashing Apple

Q. Help! The Apple symbol, in the upper left corner of my screen, flashes all the time — in every program.

John Oliphant
Concord, MA

A. Relax, John. It's just your Alarm Clock DA going off. The alarm was set, and you've never turned it off. The reason it's flashing instead of beeping is that your sound is turned all the way down in the Control Panel. To stop the flashing, simply turn off the alarm (see Figure 2).



Figure 2: To turn off the Alarm Clock DA, click on the expander (1), then click on the alarm (2), and finally, click the alarm on/off switch (3).

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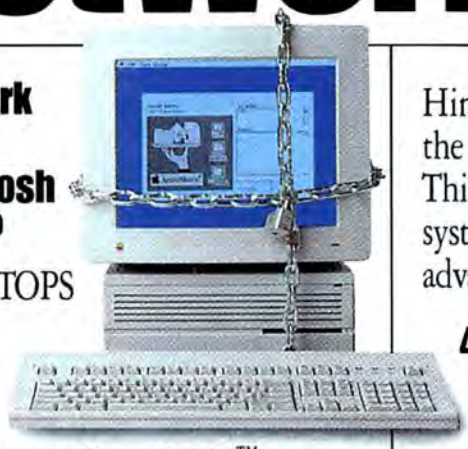
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Liaison—recipient of the 1989 Eddy for Best New Networking Product and the only five mouse network product review, "Robust security... Works every time... A brilliant piece of programming... Look to Liaison first." MacUser, April 1989

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Take This Simple Network Test.



1. Which Network Doesn't Tie Up A Valuable Macintosh As A File Server?

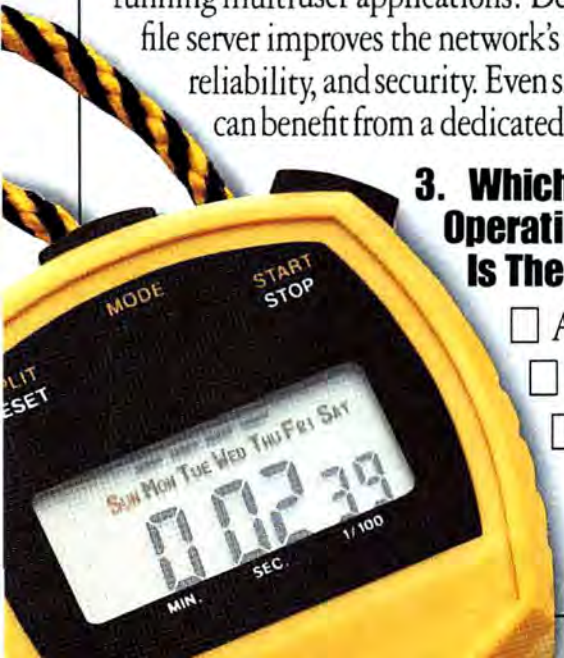
☐ AppleShare ☐ TOPS
☐ DaynaNET

Hint: AppleShare® requires a dedicated Macintosh® as a file server. DaynaNET™ runs on an inexpensive yet fast IBM® compatible 286 or 386 personal computer. Distributed networks such as TOPS® don't require a dedicated file server, but steal processing power from every Macintosh on the network.

2. Does A Real Network Need A Dedicated File Server Anyway?

☐ Yes ☐ No

Hint: A file server provides centralized storage and management of information and a basis for running multiuser applications. Dedicating the file server improves the network's performance, reliability, and security. Even small networks can benefit from a dedicated file server.



3. Which Network Operating System Is The Fastest?

☐ AppleShare
☐ DaynaNET
☐ TOPS

Hint: Both TOPS and AppleShare run on top of the Macintosh or MS-DOS® operating system. This slows them down. The DaynaNET operating system directly controls the file server, taking full advantage of all its speed and processing power.

4. Which Network Will You Never Outgrow?

☐ AppleShare ☐ DaynaNET ☐ TOPS

Hint: You soon outgrow a distributed network such as TOPS, because its performance deteriorates as you add users. Adding to an AppleShare network requires additional costly Macintosh file servers, so you soon outgrow your budget. DaynaNET's generous upgrade program lets your network grow as you grow in affordable stages.



Prices include the DaynaNET operating system software and one DaynaTALK PC network interface card for the file server. All models of DaynaNET can be upgraded, and we apply a generous credit for the model you currently own against the price of the upgrade.

Buy DaynaNET before March 31 and get a free DaynaTALK™ for Macintosh 5-Pack.

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Answers:

1. DaynaNET. It's like getting a Macintosh free. 2. Yes. Unless you're using your network just for printing, and don't mind waiting. 3. DaynaNET. In fact, DaynaNET is a unique version of NetWare®, the leading high performance networks system in use today. 4. You guessed it. DaynaNET. And for even more growth, DaynaNET networks can be connected together, as well as to networks running NetWare.

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INSIDE SCOOP

Electronic Color Stripping

with PhotoMac and QuarkXPress

To get the Inside Scoop on PhotoMac, we went straight to the source — its developers — and uncovered some terrific techniques.

By Tobin Koch

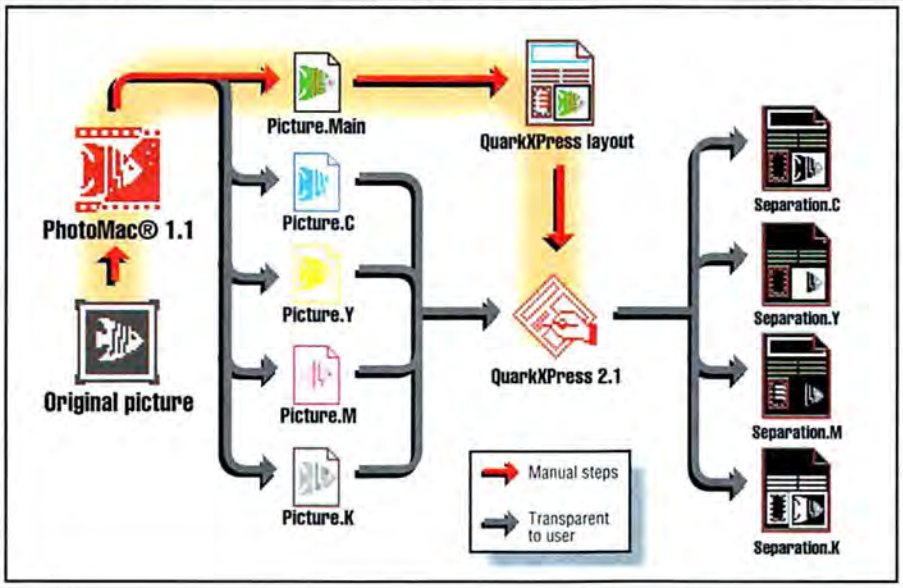
Color prepress on the Mac is something desktop publishers have been dreaming about for some time. Unfortunately, most articles on this subject highlight links to high-end input and output systems, and these links are anything but cheap. In fact, they may leave you wondering why you need a Mac in the first place, since the high-end part of the system seems to do all the real work. The good news is that if you have less than $30,000 in equipment, or even less than $10,000, you still have access to some high-end functions, and you can do it all on your Mac.

QuarkXPress now has the ability to color-separate a complete page layout, including background tints, typography, and color EPSF graphics from programs such as FreeHand and Illustrator 88. Unfortunately, QuarkXPress can't separate a TIFF or PICT bit-mapped color image. The latest release of PhotoMac, version 1.1, gets around this problem. It lets QuarkXPress users add 24-bit color images to page layouts and then output color separations of the *entire* page layout directly to film through an imagesetter, in effect bypassing high-end prepress systems.

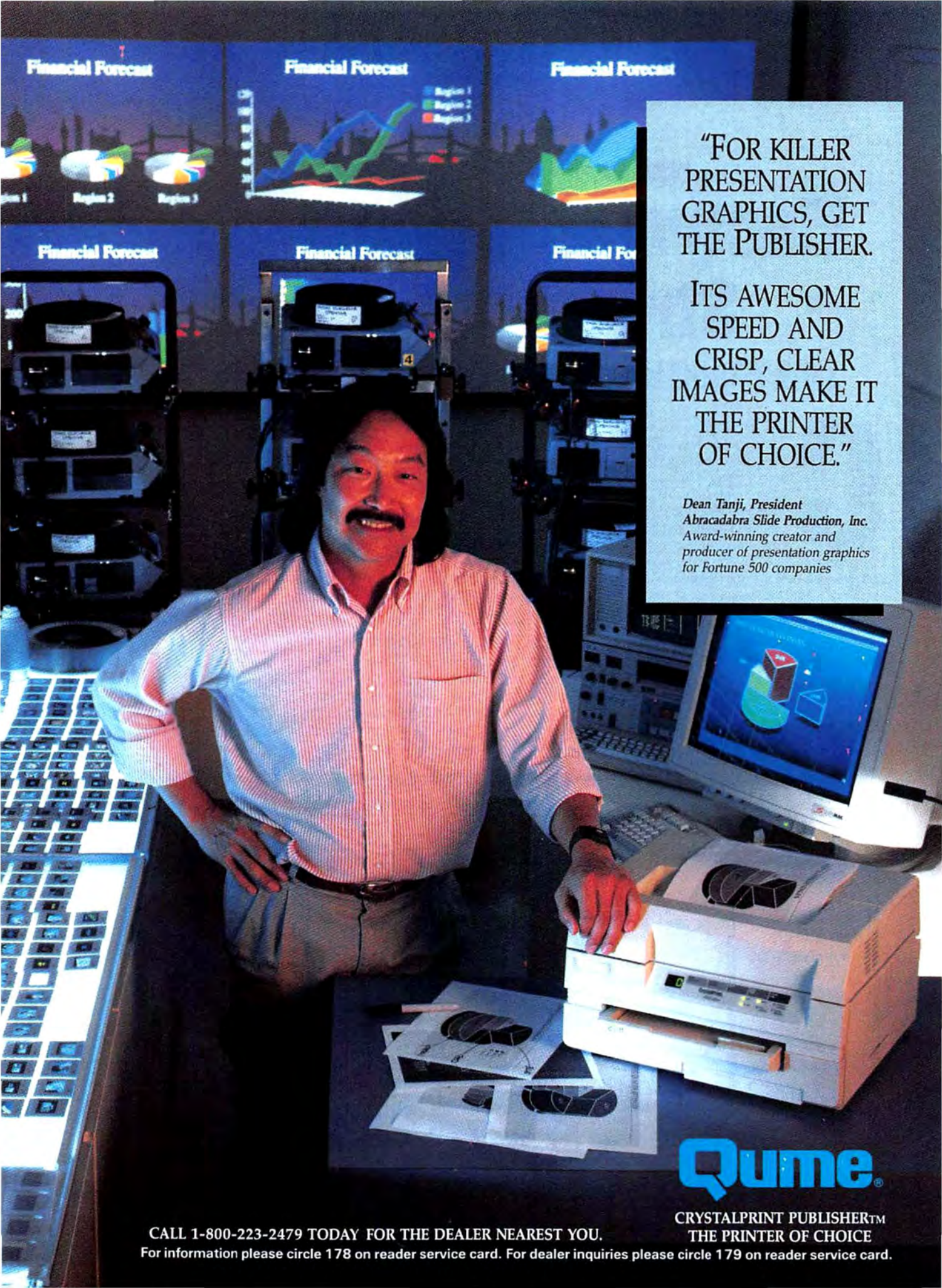
A Quick Tour of Color Stripping

In offset printing, four ink colors — cyan, magenta, yellow, and black (CMYK) — are combined on a page in various proportions to create *process colors*. Each ink color is applied by a separate printing plate. In order to print a color photograph, an image must first

Figure 1: Electronic Color Stripping with PhotoMac and QuarkXPress



QuarkXPress can't color-separate a TIFF or PICT image on its own, but PhotoMac 1.1 can separate these images and save them in a Quark-compatible format. A low-resolution Main image is placed in QuarkXPress; it has links to the high-resolution separation files. When you color-separate the QuarkXPress file, the PhotoMac separations are automatically merged with the QuarkXPress data to create a single set of separation files.


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be *color-separated* and each color recorded onto a halftone negative. Each of the resulting four negatives must then be placed by hand, or *stripped*, into a master page-layout negative, commonly called a *flat*. Completed flats typically also contain negatives for type and line art. Each flat is photographically exposed onto a printing plate, which in turn is chemically developed, mounted onto the printing press, and used to transfer ink to paper. Depending on the complexity of the design, color separation and stripping can significantly affect the final printing cost.

Electronic color stripping differs from the traditional method in that the software does the stripper's job. All the design components — color graphics, type, and scanned color photographs — are positioned in a page-layout program. Finally, the whole layout is separated into four PostScript files that are sent to a PostScript-compatible imagesetter and emerge as color-separation films. These are equivalent to completed flats and are ready to be exposed onto printing plates.

How much disk space do I need to run PhotoMac?

PhotoMac uses hard-disk space for its working area while you're editing an image and during the color-separation process. The space requirements vary with factors such as the size of the image and the percentage of reduction or magnification you use. The following formulas should help you plan ahead for successful work sessions.

The values and formulas are mathematically correct, but because other disk-related events occur during the Mac's normal operation, you should allow about 20 percent more space than the results of your calculations suggest. The figures below are for a 2-x-3-inch image screened at 133 lines per inch. (Note: When you're converting bytes to kilobytes, the formula is 1,024 bytes = 1K.)

A. Size of a PhotoMac file in pixels

(vertical dimension in inches) X (horizontal dimension in inches) X (line-screen frequency used for separation)^2 X 4 = *n* bytes

2 x 3 x (133)^2 x 4 = 424,536 pixels

B. Size of a PhotoMac file in bytes

(number of pixels from formula A) X 3 = *n* bytes

424,536 x 3 = 1,273,608 bytes (1,243K)

C. Disk space required to open a file

(number of bytes from formula B) X 3 = *n* bytes

1,273,608 x 3 = 3,820,824 bytes (3,731K)

D. Disk space required to color-separate a file at 100 percent

(number of pixels from formula A) X 7 = *n* bytes

424,536 pixels x 7 = 2,971,752 bytes (2,902K)

E. Disk space required to color-separate a file at other than 100 percent

(number of bytes from formula B) + [(number of pixels from formula A) X (reduction/magnification factor)^2 X 7)] = *n* bytes

1,273,608 bytes + (424,536 pixels x 2^2 x 7) = 13,160,616 bytes (12,852K)

PhotoMac and QuarkXPress

PhotoMac can preseparate a color image and create color-separation files in a QuarkXPress-compatible format. Actually, PhotoMac creates four PostScript separation files, plus a fifth file (suffixed Main), which is an 8-bit color file that QuarkXPress uses for positioning and screen display only. The Main file contains information that automatically links it to the 24-bit color-separation files. Here's the process:

1. Open PhotoMac, open the image file you want to work with, and edit it as necessary. (You can still resize the picture once it's been imported into QuarkXPress.)

2. Select Separate Colors from the File menu, click on the QuarkXPress EPS Format button at the bottom of the dialog box, click on Save, and quit PhotoMac.

3. Open QuarkXPress, and use Get Picture to place the file that's suffixed Main into your layout. You can position, crop, and scale the placed image as you would any other imported art.

4. When your layout is finished and you're ready to output to an imagesetter, make sure the following files are available when you issue the Print command:

a. The QuarkXPress layout document.

b. Four (C, M, Y, and K) separation files, plus a Main file for each PhotoMac-separated picture (see Figure 1).

c. One color EPSF file for each FreeHand or Illustrator 88 image in your layout.

5. Use QuarkXPress to color-separate your document pages by checking the Make Separations box in the Print dialog box. All your color graphics, both line art and photographs, will appear in the resulting separations exactly as you placed them in the layout.

Tobin Koch is the editorial-relations manager for Avalon Development Group, the developer of PhotoMac.

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Once you see the difference Adobe Type Manager makes with its 13 resident fonts, you'll want to build your own high-quality type library.

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This is actual, unretouched ImageWriter output at 80 pt. and 12 pt. sizes using Adobe Type Manager.

These unretouched photos make it easy to see how much better your text can look with Adobe Type Manager.

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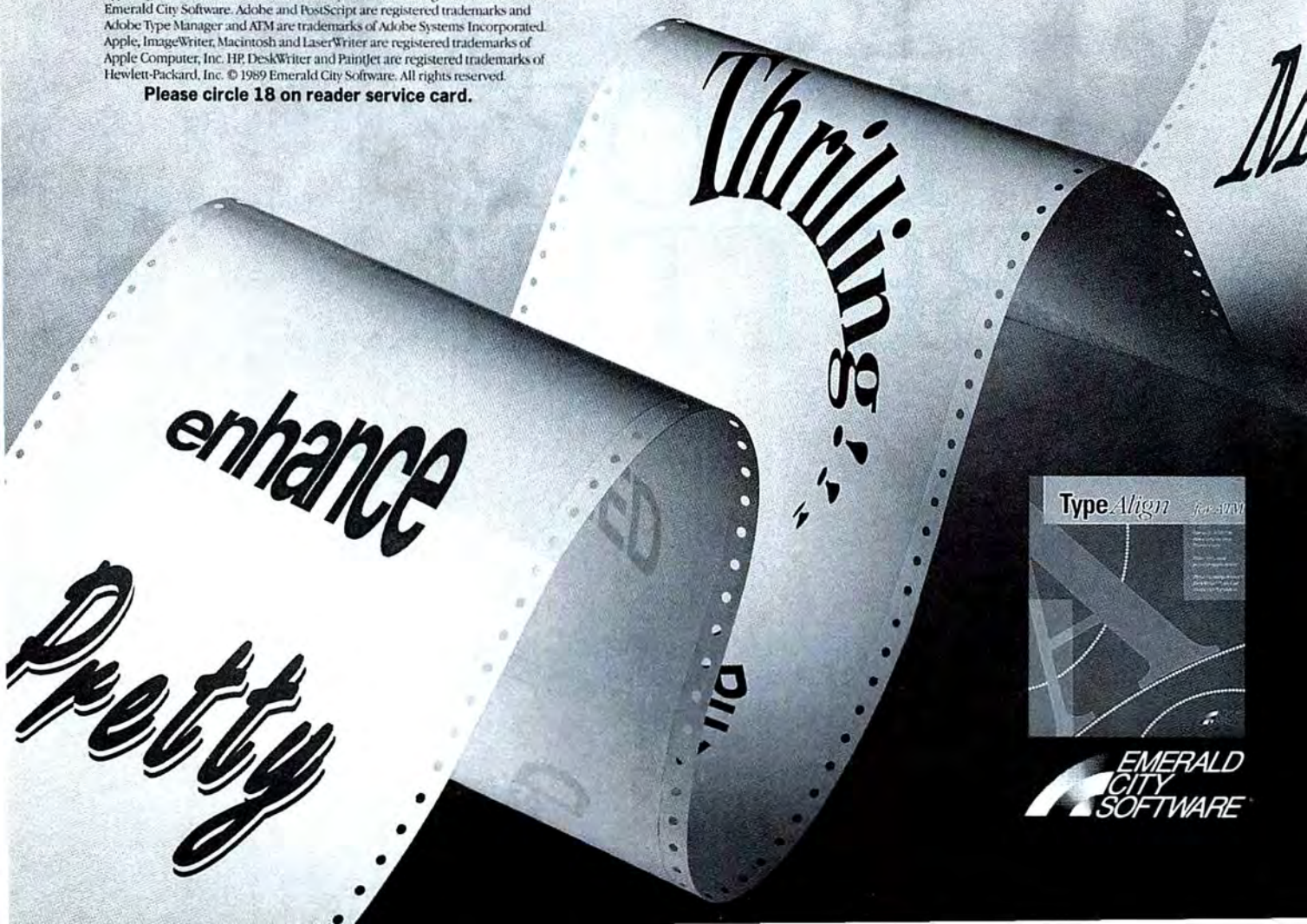
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DTP TIPS

Creating Really BIG Art

If you've ever wanted to produce a really big image from your Mac, then PosterWorks is the program for you. This utility takes 8- or 24-bit color TIFF images (or CT2T files from prepress systems) and turns them into posters as large as 100 square feet. It can also create enlarged halftones, color prints, and color separations. PosterWorks can also perform some color corrections, and it can generate a test target to calibrate printers and imagesetters to ensure accurate reproductions.

The program breaks the oversized image into tiles, numbering them and adding crop and registration marks if desired. The resulting output can be sent to any PostScript printer or imagesetter, and it can be printed on non-PostScript devices if you use CAI's Freedom of Press.

PosterWorks costs $167 and should be of special interest to the advertising industry. Contact S.H. Pierce, One Kendall Square, Building 600, Suite 323, Cambridge, MA 02139; (617) 395-8350.

— Aileen Abernathy



PosterWorks produced this 6-x-9-foot poster as 64 tiles on a QMS ColorScript 100 printer. The original art was a 35mm slide scanned into an 8-megabyte TIFF file.

Fear of Fractions

Most desktop publishers avoid fractions because the standard Adobe fonts don't provide them and workarounds usually produce awkward results. But fear no more: Fractions aren't as formidable as you might think. Here's a rundown of your options for fashioning fractions.

A primitive but nearly foolproof way to make a fraction is to make the numerator a superscript and the denominator a subscript, both of which should be a couple of points smaller than the text size. For best results, separate the two numbers with the special fraction slash by pressing Shift-Option-1. The fraction slash is slanted more than the regular slash and thus fits better with the numbers, giving the fraction a more professional look. The advantage of this method of making fractions is that it works in virtually any word-processing or page-layout program.

Among word processors, the best fraction fabricator is Microsoft Word, which has a built-in mathematical typesetting language with a special command just for fractions. Word's fractions can be in any font and size, but they can't be pasted into other applications. You can get around this limitation by turning the fraction into a graphic (select it, and press Command-Option-D) and then pasting it into another program.

If you're looking for a less manual solution to the fraction problem, you can use a font that provides fractions. At the low end, several non-PostScript fonts offer fractions. One is a shareware ImageWriter font package called Fabulous Fractions. These fonts have an elaborate system of overstrike characters so that you can type virtually any fraction in a line of text. The fonts work fine in MacWrite and Word, but MacWrite II makes a royal mess of them. Send $10 to Marvin Schwartz, Apt. 4V, 119-40 Union Turnpike, Kew Gardens, NY 11415.

Another ImageWriter option is Mathwrite, an extension of the Geneva font that uses a horizontal bar for creating fractions and also includes math symbols

Figure 1: Fractional Options

The most primitive way to make a fraction uses a superscript as the numerator and a subscript as the denominator:

fraction slash (Shift-Option-1) 44⁄100 → $^{44}/_{100}$

regular slash 44/100 → $^{44}/_{100}$

Word's built-in mathematical typesetting language (.\F(44,100)): $\frac{44}{100}$

The HelveticaFractions font (PostScript): $\frac{4}{9}$

such as roots, exponents, Greek letters, and geometric symbols. Mathwrite comes in 11 sizes, the largest being 42 points, which provides high quality on the ImageWriter LQ. Send $20 to Thaeler Educational Software, 1540 E. Gentile St., Layton, UT 84040-4555.

If PostScript is a priority, look for the shareware font called HelveticaFractions, which provides all 36 single-digit fractions in Helvetica. These fractions have a horizontal slash, which some people prefer, but they look out of place unless the surrounding text is sans serif. Mail $10 to Bradley Poulson, 4003 Martin Lane, Two Rivers, WI 54241.

Filling the gap in serif fractions is a commercial font called Bill's Box Specials, which sports 17 fractions in both serif and sans serif styles. This downloadable PostScript font also includes dingbats and — are you ready for this? — lobsters. Send $30 to U-Design, 201 Ann St., Hartford, CT 06103; (203) 278-3648.

Even Adobe has finally created nine common fractions, although only in its Expert Sets. These extended character sets complement the new Adobe Originals typefaces (Garamond and Utopia are the first two) and also contain small caps, additional ligatures, and superior and inferior letters. Each Originals face is $275, and its Expert Set is $185. Contact Adobe Systems, Box 7900, Mountain View, CA 94039; (800) 344-8335.

Perhaps the ultimate in PostScript-perfect fractions comes from the little-known Caps&Frac font. Like Fabulous Fractions for the ImageWriter, Caps&Fracs lets you use the Option key to create virtually any fraction, using either Times or Helvetica. This $99 font, which also contains a full set of small caps, is available from MacTography, 326-D North Stonestreet Ave., Rockville, MD 20850; (301) 424-3942.

— Dave Valiulis

Build Your Own Fraction Font

If you'd like to add fractions to your favorite font or create a fractions-only font, then check out ParaFont. This utility from Design Science lets you create new PostScript fonts by customizing existing ones (including Adobe's encrypted fonts).

ParaFont can easily create fractions — an entire font of them, if you desire — from any typeface you have. You can also add small caps, old-style numerals, superior characters, and ligatures. Existing font characters can be slanted, expanded, compressed, or scaled; you can even mix and match characters from several different fonts for a truly unique look. The resulting Type 3 PostScript fonts work just like any other font does. ParaFont is $99 and is available from Design Science, 6475-B E. Pacific Coast Highway, Suite 392; Long Beach, CA 90803; (213) 433-0685.

— Aileen Abernathy

How to avoid an art attack.

Let's face it. The scrapbook that comes with your Mac can be rather unnerving. Forcing you to limit the number of graphics you can store. Chase around to find the ones you want. And you can't even crop or scale them.

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With SmartScrap, you can create and name as many scrapbooks as you want. So you can store more images, and organize them like never before. Even 32 bit color images.

And no more paging through your scrapbook. Either search for your image by name, or choose from the pictorial Table of Contents that displays your graphics in miniature. Can't see what an image looks like because it's bigger than the window? With SmartScrap, you can scroll horizontally and vertically and see the entire picture before you copy it. You can even copy just part of an image with a marquee or lasso.

What if your image doesn't fit the space allotted in your document? Or there's more picture than you really want? No problem.

Instead of going back to the application the image was created in, just copy it to the clipboard and use The Clipper to scale and crop it precisely. Either visually, or using numeric coordinates provided by The Clipper.

So don't let your graphics get to you. Get SmartScrap & The Clipper II, instead. It's just $89.95 at your dealer or direct from Solutions Inc.

MacUser Best New Desk Accessory 1987

Getting just the right graphic to just the right size is easy with SmartScrap & The Clipper II. ▶

SmartScrap lets you instantly choose the picture you want from a pictorial Table of Contents. ▼



▲ *Trim or scale your graphic to the dimensions you need with The Clipper.*

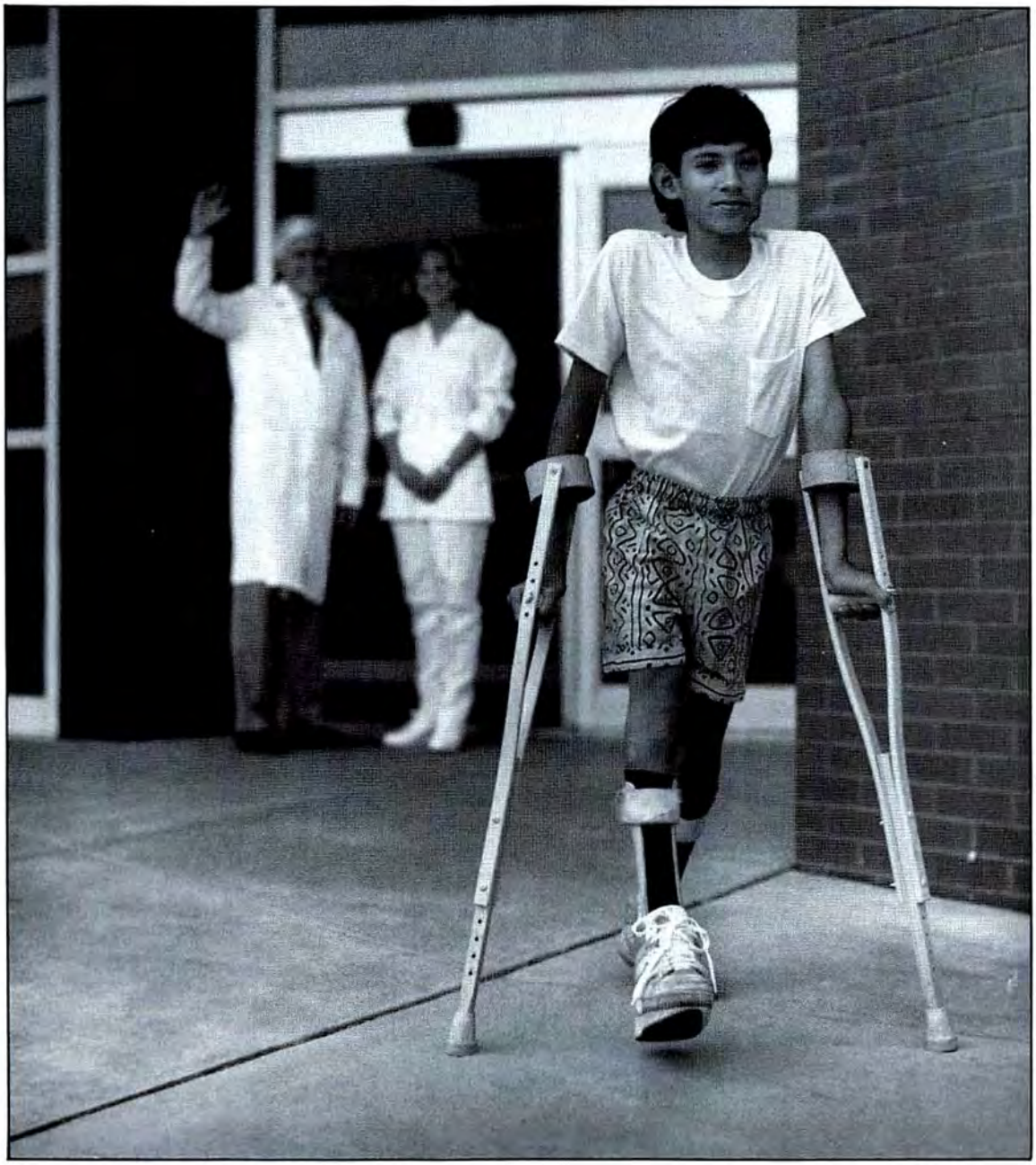
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BRIDGES

Currents

More Big Blue Connections Coming

In the past, Mac-to-mainframe connectivity has been like an open-air market. No single vendor has offered a solution for every customer; you've had to move from stall to stall to find something that exactly meets your needs. Avatar now intends to become a one-stop shopping outlet for Big Blue connections by offering several new software and hardware products, which are scheduled for release during the first two quarters of 1990.

Avatar's MacMainFrame external serial interface and NuBus cards have provided connections between individual Macs and IBM mainframes. The new products — 22 new cards and several new applications — allow Macintoshes on LocalTalk, EtherTalk, or TokenTalk networks to share access to a mainframe via coax, token-ring, or serial SDLC connections, using the Mac as a gateway. Avatar's MacMainFrame Graphics software offers APA color-graphics-terminal emulation.

Coax. Up to now, those who installed coax boards in their Macs got the advantage of a single high-speed connection in CUT mode or multiple sessions from a single Mac in DFT mode. But the price was high: $995 for a CUT-mode coax card, and $300 more for one with DFT. The new MacMainFrame Coax Gateway ($2,495) reduces the cost per node significantly by giving any Mac anywhere on an AppleTalk internet access to a



Figure 1: One of Avatar's barrage of new products is MacMainFrame Graphics, which lets Mac users edit mainframe graphics with a mouse.

Net Prophet

Do you spend too much time staring at the "Updating Desktop file" message when copying files in the Finder? Or is the wait between when you double-click on a document and the launch of the application too long for your taste? Or — much worse than either of these — do you have a large hard-disk drive with many applications that crashes for no apparent reason when you copy files to it? If any of these scenarios applies to you, then Apple's Desktop Manager can put an end to your frustration.

The Finder keeps information about files on a volume, such as which icon to display on the desktop, in an invisible file named Desktop. Access to the information in Desktop slows drastically as its information content increases. An upper limit exists on the amount of information that can be stored; Desktop's management scheme was designed before large hard disks were so prevalent. If Desktop's upper limit is reached, your hard disk may very well crash spectacularly.

The DTM (Desktop Manager) INIT ships with AppleShare server software. It replaces the Finder's standard method of managing Desktop with a faster scheme that can better deal with large amounts of data. DTM is a small database engine designed to handle Desktop information. If you have a large volume or many applications or simply want to add a bit more zip to Finder operations, DTM is the answer.

Because DTM implements a fast little database, it takes the Finder much less time to look up the application that is associated with a document. The difference is especially obvious when you're copying files: The "Updating Desktop file" message rarely stays on-screen long enough for you to read it.

Apple doesn't officially support DTM for use on single-user (non-server) systems, but the benefits far outweigh the possible risks; you shouldn't have any problems. In fact, System 6.0.4 incorporates explicit support for DTM, so Apple tacitly admits that people need and use DTM.

To install it, drag the Desktop Manager INIT into your Mac's System Folder and restart your Mac. Just after your last INIT has loaded — that is, just before the Finder launches — hold down the Command and Option keys. When the Finder comes up, it will present you with a dialog box asking whether you want to rebuild the desktop on your startup volume; click on OK. Repeat this process for every local volume; this includes multiple partitions on a single hard disk but not remote volumes such as servers.

One caveat: If you have many Adobe printer fonts on your hard disk, DTM is going to have problems. This is Adobe's fault, though; hopefully, it will deal with the problem soon. The simplest solution is to move all the font files off your hard disk, rebuild your desktop, and then move them back.

Purely for paranoia's sake, you should rebuild your desktop every month or so. It doesn't hurt, although you lose your files' Finder comments, and rebuilding keeps DTM's database current.

— Stephan Somogyi

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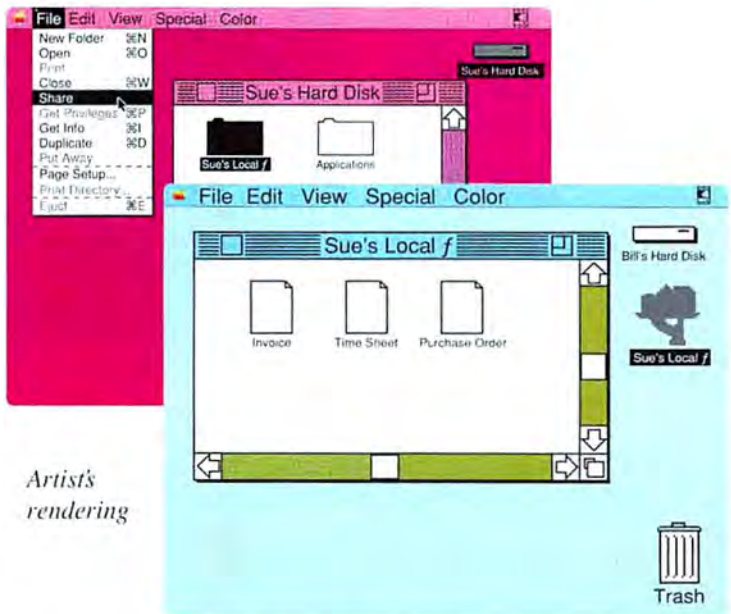
MacUser

mainframe through a single card.

The gateway consists of a coax card in an SE, SE/30, or NuBus (Mac II family) machine running the Avatar gateway software. Like a normal coax connection, this gateway supplies up to five simultaneous sessions. But whereas Avatar's earlier cards limited sessions to a single Mac, the gateway lets any Mac user on an AppleTalk internet use one of the sessions. Up to five Macs can communicate through the gateway simultaneously. If you need more sessions, you can add more gateways, each supporting five additional sessions. The gateway Mac doesn't have to be dedicated; you can, for example, run Apple's AppleTalk Internet Router software on the same machine. Unfortunately, there is no upgrade path for current owners of MacMainFrame coax cards to the new gateway versions of these products.

Token Ring. Avatar is also jumping on the token-ring bandwagon with two new product lines: MacMainFrame Token Ring Workstation and MacMainFrame

AppleShare without Servers?



Artist's rendering

An interesting item of note in Apple's end-of-year update on System 7: The new version of Macintosh system software will include a previously unannounced feature, Macintosh FileShare, which Apple is billing as an extension of the Finder. The idea has been kicking around the halls of Cupertino for a while, going by the name Personal AppleShare. Apple has finally decided to take the wraps off and ship it this year.

At any rate, Macintosh FileShare will be Cool Stuff (or, as my 11-year-old kid Ona would put it, "fresh"). Details of how it will work were not available at press time, but the basics go something like this: You select a folder on your desktop and then choose the new Share command from the File menu. Now anyone else on the network can see your folder listed as an AppleShare volume in the Chooser.

AppleShare requires that you dedicate a Mac (or some other chunk of hardware) as a server. If Sue wants to use AppleShare to transfer a file from her Mac to Bill's, she has to copy it from her Mac to the server and he has to copy it from the server to his machine. With FileShare, everyone's Mac can become a miniserver. Sue will be able to give Bill direct access to the files on her local hard disk — a one-step process.

— Henry Bortman



Token Ring Gateway. The Workstation ($1,295) comes with 3270-emulation software and a token-ring card for an SE, SE/30, or NuBus Mac. It allows the Mac in which the card is installed to establish up to eight sessions with a mainframe. The Workstation software (available separately for $395) can also support token-ring cards from Apple and other vendors, provided they are IEEE-compatible.

The MacMainFrame Token Ring Gateway — like the Coax Gateway — expands host connectivity from one Mac to a network. A Mac with a Token Ring Gateway card installed can provide mainframe access to any Mac on the same internet. Pricing depends on the total number of sessions you want to support: 8 costs $2,495; 32 sessions are $4,495; and 64 are $6,495. If your needs grow, a ROM-and-software upgrade ($2,495) will take you from 8 to 32 sessions or from 32 to 64.

SDLC. Avatar's new product lines for SDLC connections are almost identical to its token-ring offerings. MacMainFrame SDLC Workstation (an SE, SE/30, or NuBus card, plus software) lets a single Mac support up to 8 sessions. MacMainFrame SDLC Gateway shares 8, 32, or 64 sessions with multiple Macs on an internet. Pricing for the SDLC products is the same as for the comparable token-ring products. The only difference is that the mainframe connection is SDLC instead of token ring and that, although 32- and 64-session SDLC gateway cards are available for the SE/30 and NuBus machines, the SE version supports only 8 sessions.

Prior to Avatar's announcements, the only supplier of IBM-mainframe gateways has been Tri-Data, with its SDLC-based Netway products. Netway is much less expensive (although slower) than Avatar's direct coax connections, which require each Mac user to install a coax card (see "Mac-to-Mainframe Mating," January '90). But Avatar's new gateway products offer Netway some stiff competition. The main difference is in the hardware approach. Avatar uses a Mac, with its 68000-family CPU, as the gateway, whereas Tri-Data's Netway is a dedicated piece of hardware, based on SPARC (RISC) technology.

The last addition to the Avatar stable is MacMainFrame Graphics ($195). This software package, which provides IBM 3179G/3192G color-graphics-terminal emulation, can also do file transfers. MacMainFrame Graphics supports the PIF file format used on PCs and the GDF format used on mainframes, and it allows communications with mainframe software such as SAS/Graph and Tell-a-Graf. MacMainFrame Graphics will be available for the SE/30 and Mac II line during the second quarter of 1990. For more information on these products, contact Avatar, 65 South St., Hopkinton, MA 01748; (508) 435-3000.

— John Rizzo

MacDOS

If you can't or won't connect to a Big Blue mainframe, you can try running those cursor-bound PC programs directly on your Mac. Insignia Solutions' SoftPC ($399), the software emulator that runs DOS inside a window on your Mac, now has an add-on module that enables the program to emulate more-powerful PCs. SoftPC previously emulated a PC XT; the SoftPC EGA/AT Option Module ($199) brings performance up to that of an AT (80286 processor). Insignia claims that SoftPC runs 50 percent faster with the Option Module. If you have an SE/30 or Mac II, you should see even greater speed improvements in floating-point operations, as the Option Module takes advantage of the 68882 math coprocessor in these Macs.



Fans of DOS graphics will appreciate the fact that SoftPC users will also be able to run color EGA PC programs. DOS users usually feel at home with SoftPC, which reproduces every detail of the PC, down to a digitized version of the grinding startup sound of the floppy drive. Any volume accessible to the Mac is accessible to SoftPC as drive A, C, D, and so on. The EGA/AT Option Module should be out by now; it's available both with SoftPC and as a separate package. Insignia Solutions, Inc., 254 San Geronimo Way, Sunnyvale, CA 94086; (408) 522-7600.

— John Rizzo



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Look, Ma — No Wires

Photolinks use infrared light bounced off a wall or ceiling to establish LocalTalk connections. And they work!

By Henry Bortman

Take a bunch of people with Macs. Put them into reconfigurable cubicles. Put the cubicles into a big open space, say into a warehouse. Wire all the Macs with LocalTalk or PhoneNET. If you want, put some StarControllers into the phone closet and run wires from all the cubes to the StarControllers.

Now have management do a reorg (that should be easy). Rearrange the cubicles so all the wires go to the wrong places. Call the telephone company, and ask someone to come out and rewire everything. Wait. Tell the people who work in the cubies and rely on the network that they should keep getting their work done.

Six months later, do another reorganization. Move everyone around again. Don't miss any deadlines. And don't go over budget.

Sound familiar? Sound impossible? Now, what if you could hook all your Macs together with light — infrared light, to be precise — instead of wires? Might life get a little easier?

Indeed it might. And fortunately for those of you in situations such as this one, Photonics has come up with just such a solution: Photolink. Rather than using wires, Photolink devices use infrared light to make LocalTalk (230.4 kbps) connections.

Each Photolink device contains an infrared transceiver and four PhoneNET-style LocalTalk jacks. (If you want to use Apple's LocalTalk cabling, you will need special adapter cables and terminators. Photonics sells a kit of these for $29.) You can plug a single device (a Mac or a LaserWriter, for example) into each jack, or you can daisy-chain several devices and plug a daisy chain into each port. The only restrictions are: (1) You can't point more than 32 Photolinks at the same spot; (2) the total length of wire connected to the four ports of a single unit may not exceed 1,500 feet; and (3) you must be careful not to terminate more than two of the

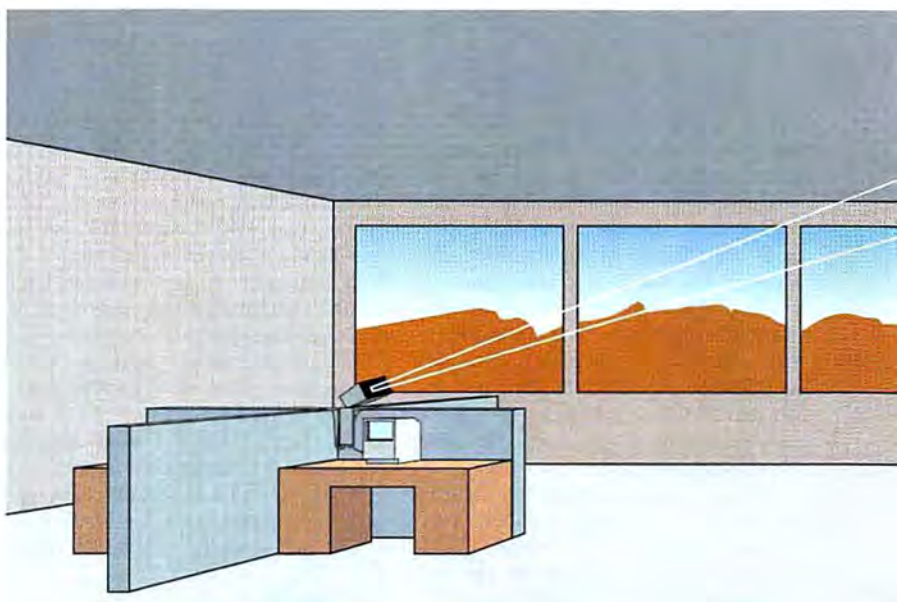


ILLUSTRATION K. DANIEL CLARK

four wire runs, regardless of how many devices you have attached. Typically, however, one Photolink can serve as a connection point for users in a group of four adjoining cubicles, each with one or two devices.

But we're getting a little ahead of ourselves. Before you hook up Macintoshes or LaserWriters to your Photolinks, you have to get the Photolinks to "talk" to each other.

Dancing on the Ceiling

Installation is simple. Photolinks connect to each other by pointing their infrared transceivers at a common spot on a ceiling or wall. Because infrared light isn't visible to humans, Photonics provides two LEDs on each Photolink — a red one and a green one — to help with alignment.

It's probably obvious by now that you can't make a very useful network connection with only one Photolink. You are likely to set up your Photolinks in a wide radius (see Figure 1), all aimed at a common point in the center of a circle of Photolinks; you may want to start by temporarily aiming one of them straight up at the ceiling (or straight across at a wall) to provide an easy target point for aligning the rest.

The real fun starts after you've pointed the first one at your chosen spot. When you plug in the second Photolink, its red LED will blink (after a brief sequence of self-test blinks by both the red and green LEDs). You rotate the Photolink's head horizontally and/or vertically to aim its light beam at the same spot the first one is pointing at. When it's lined up, the green light shines for 10 seconds while it syncs with the other units, and then it starts blinking. Continue lining up additional Photolinks this way until they're all happy. Then you can remove the first one — the one you pointed straight up — and set it up in its correct position.

The physical design of the Photolink helps simplify the installation process. Its body, which contains most of the unit's electronics, is built in the shape of a C clamp, with one long and one short side. The clamp fits easily over a cubicle partition. No special tools are required; you can even tighten the screw on the clamp with a coin. If you're not attaching it to a cubie or if it doesn't fit for some reason, you can use the Velcro strips Photonics provides to attach it to virtually any type of surface.

The head of the unit, which houses the transceiver, sits atop the clamp. When you rotate the head, it offers some resistance — not so much that it's hard to align but enough so that it stays in place. There are screws for tightening or loosening the adjustments, should you choose to use them, but most people won't find it necessary to do so.

Where to Put Them

How widely apart you can place your Photolinks and have them still work depends on the physical characteristics of your space, particularly the distance from the top of your partitions to the ceiling. In a typical example, if you have 5-foot partitions and 9-foot ceilings (or 4 feet between the top of the partition and the ceiling), you can place the Photolinks within a 35-foot radius of the spot to which they all point, or a maximum of 70 feet apart.

Now, you might think that if you put the Photolinks closer to the ceiling, the infrared light would be brighter — you all remember the inverse-square law from freshman physics, don't you? — and you could increase the distance between them. Curiously, the exact opposite is the case. The intensity of the light is affected more severely by the *angle* at which the light hits the ceiling than by the distance it has to travel. As the Photolinks get closer to the ceiling and the angle gets more acute, the light gets spread out over a larger and larger area. So the Photolinks have to be closer together. For example, if you have 8-foot ceilings and 5-foot partitions, the radius of your circle will drop to about 26 feet. Very high ceilings let you spread the devices quite far apart.

Another consideration when installing Photolinks is to get them out of the way of pedestrian traffic. If you have a set of four cubies, you will want to place a device at the point at which they intersect, not on the outer edge of one of them. Although people passing by a Photolink cause only a momentary disruption of the signal,

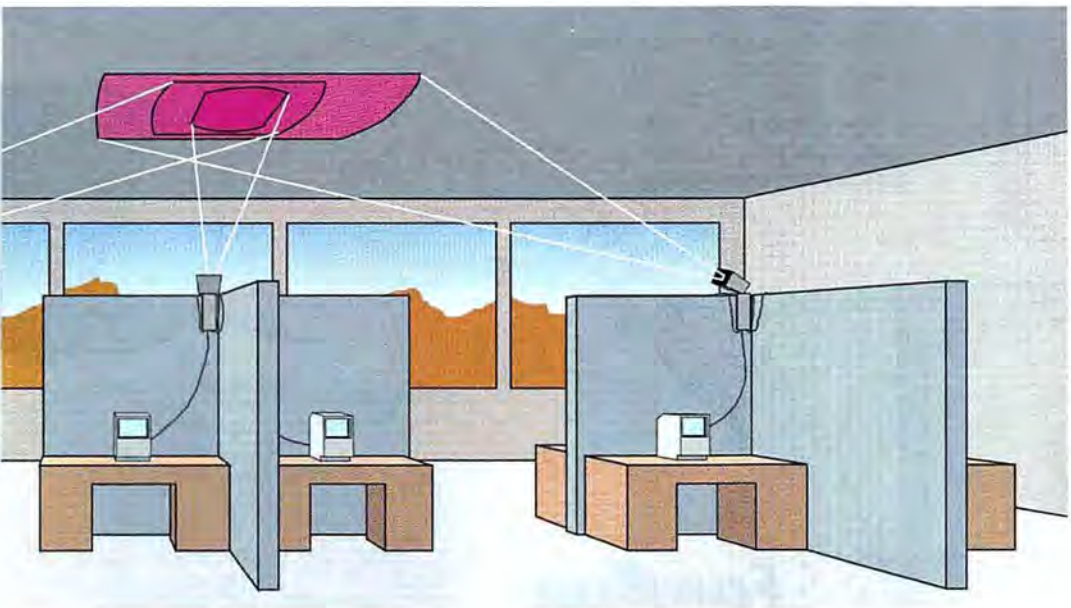


Figure 1: The smaller the distance between a Photolink unit and the ceiling (or wall), the closer together you must place the Photolinks to have them work effectively. A Photolink mounted 4 feet from the ceiling can be up to 35 feet from the center spot at which all the units point. A Photolink mounted 3 feet from the ceiling can be no more than 26 feet away.

What to do with Timbuktu.



Share screens.

With Timbuktu on every Macintosh, you can invite others to share your point of view. (Advanced password protection ensures privacy.) Sharing screens allows two or more users to work on any document simultaneously. It also allows user support people to help solve users' problems without leaving their desks. Combine Timbuktu with Farallon's network management software, and support people can manage computers and servers from anywhere on the network. Timbuktu/Remote functions similarly to Timbuktu, only over modems or ISDN links.

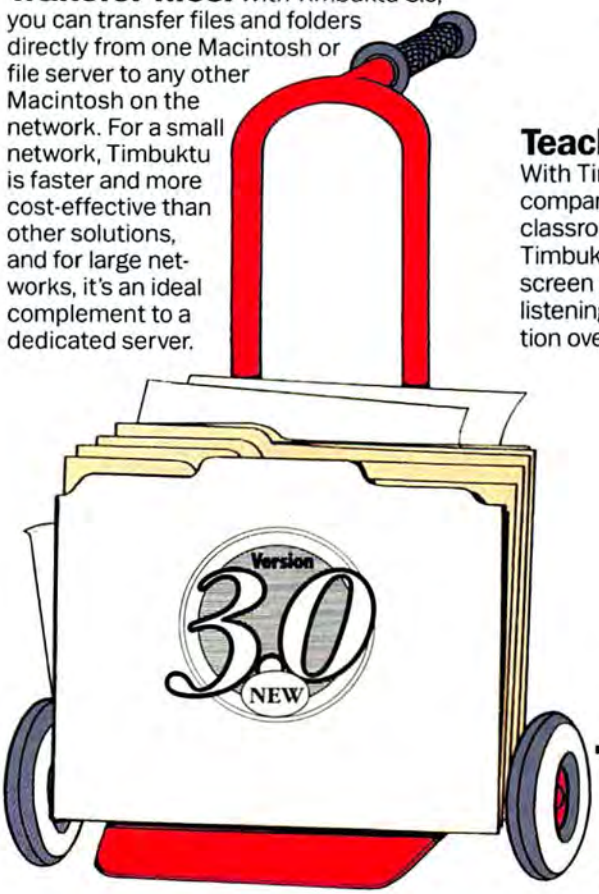
Share resources.

With Timbuktu installed on each Macintosh throughout the network, you can access any Macintosh and its databases, FAX modems, file or mail servers, or mainframe connections from any Macintosh on the network.



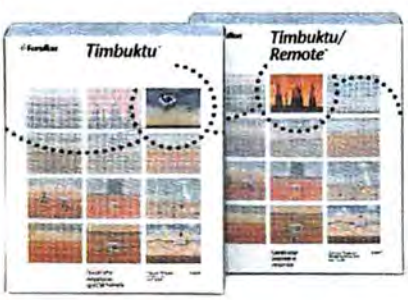
Transfer files.

With Timbuktu 3.0, you can transfer files and folders directly from one Macintosh or file server to any other Macintosh on the network. For a small network, Timbuktu is faster and more cost-effective than other solutions, and for large networks, it's an ideal complement to a dedicated server.



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Figure 2: Photolink devices use infrared light instead of wires to provide LocalTalk connections.

which translates to a slight delay in network transmission time, you wouldn't want to install a Photolink where someone standing for a minute or two and chatting with a cubicle's denizen could block its beam.

The Torture Tests

MacUser's NetWorkShop tested a set of four Photolinks in January, and they passed with flying colors. They were easy to install and worked as advertised. We did a number of nasty things to push them to their limits — and beyond — and found that, as long as we stayed within Photonics' recommended specifications (and sometimes even when we didn't), the Photolinks kept chugging data through.

Test #1: The Long Wire. We hooked up one pair of Photolinks about 70 feet apart. We attached a Macintosh on a short cable to one; to the other, we attached a 3,000-foot length of 22-gauge wire, which was attached to a StarController, which was attached to another 3,000-foot length of wire, which was attached to another StarController, which was attached to another 3,000-foot wire, which was attached to a second Macintosh.

We sent several thousand echo packets from one Mac to the other. Almost none got lost in this configuration. (Echo packets are a form of test data. Mac A sends an echo packet to Mac B; when Mac B receives it, it sends it back to Mac A. If it comes back intact, everyone is happy. If more than a few packets get lost, you can tell something is wrong with the network connection.)

When we added another pair of Photolinks on the "short wire" side of this setup, pointing to a different spot, we ran into problems. An unacceptably huge number of packets got lost. Then we read the manual and found out we weren't supposed to do that. You can point up to 32 Photolinks at a single spot, but if you want to connect Photolinks that are pointing to different spots, you need to put a router between them. Otherwise, the timing delays introduced by the Photolinks combine to create an unacceptable performance.

Test #2: Poor Termination. LocalTalk networks must be properly terminated, or unwanted signal "reflections" can interfere with valid network signals (see Bridges, April '89). Photonics recommends that each Photolink have two of its four jacks terminated. We found that they worked fine if we stuck to this spec.

In some networks, overtermination can cause problems; in others, undertermination can. So we tried both. To Photonics' credit, overterminating the Photolinks didn't introduce errors. Undertermination was more problematic, though. With no terminations, the Photolink hardly got any packets through successfully. Moral: Follow the directions, and you'll do just fine.

Test #3: Interference. Because a Photolink is an infrared device, we wondered if other infrared devices would interfere with its signal. We set one up within a few feet of one of the infrared security-card readers that inhabit the MacUser offices. The Photolink didn't even notice. When one of our lab technicians pointed a VCR remote control, which uses infrared light, directly at a Photolink, however, it did cause some packets to get lost. Lost packets require retransmission, which makes the network seem slow. In this case, the delay was about the same as that caused by someone walking in front of a Photolink momentarily — barely noticeable, really.

Test #4: Surfaces. Because we were so busy doing the first three tests, we had time only to try our ceiling (white acoustical tile) and our wall (off-white plaster). However, Photonics claims that any surface that isn't highly reflective should work without trouble. I have seen Photolinks do quite well when they bounced their beams off very dirty canvas at trade shows.

Try It Yourself

At $995 per unit, or (assuming you hook up one Mac to each of a Photolink's four ports) around $250 per node, Photolinks may sound expensive. But you're likely to spend at least that much to rewire a set of cubies the next time the edict comes down from on high for everyone to play musical office space.

Although Photolinks are not a solution to everyone's physical networking problems, we recommend the system highly for the types of environments for which it was designed. But Photonics lets you see for yourself. The product comes with a 30-day money-back guarantee. Try it for a month. If you don't like it, give it back.

And, by the way, if you're looking for connections other than LocalTalk, Photonics plans to ship a 3270 version in October. An EtherTalk version is expected in early '91, with one for token-ring networks by the end of '91.

The NetWorkShop thanks Farallon Computing for loaning us the StarControllers we used for testing Photolinks.

Report Card

Photolink ★★★★½

Photolink devices provide LocalTalk connections with infrared light instead of wires. Easy setup makes the system a cost-saving alternative to rewiring for offices in which cubicles are constantly being reconfigured.

List Price: $995 per unit (minimum of two required).

Photonics Corp., 200 E. Hacienda Ave., Campbell, CA 95008; (408) 370-3033.



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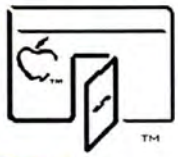
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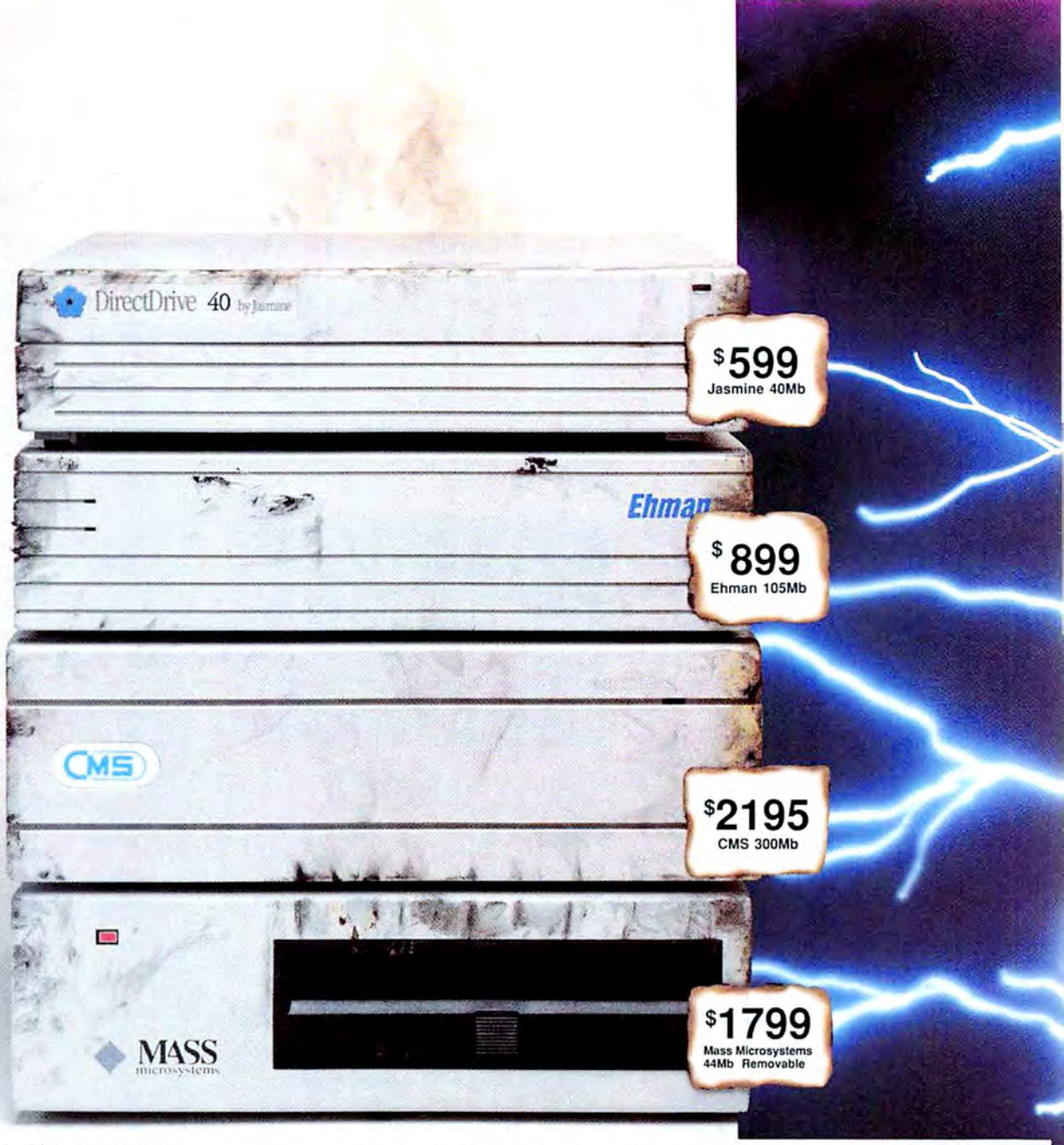
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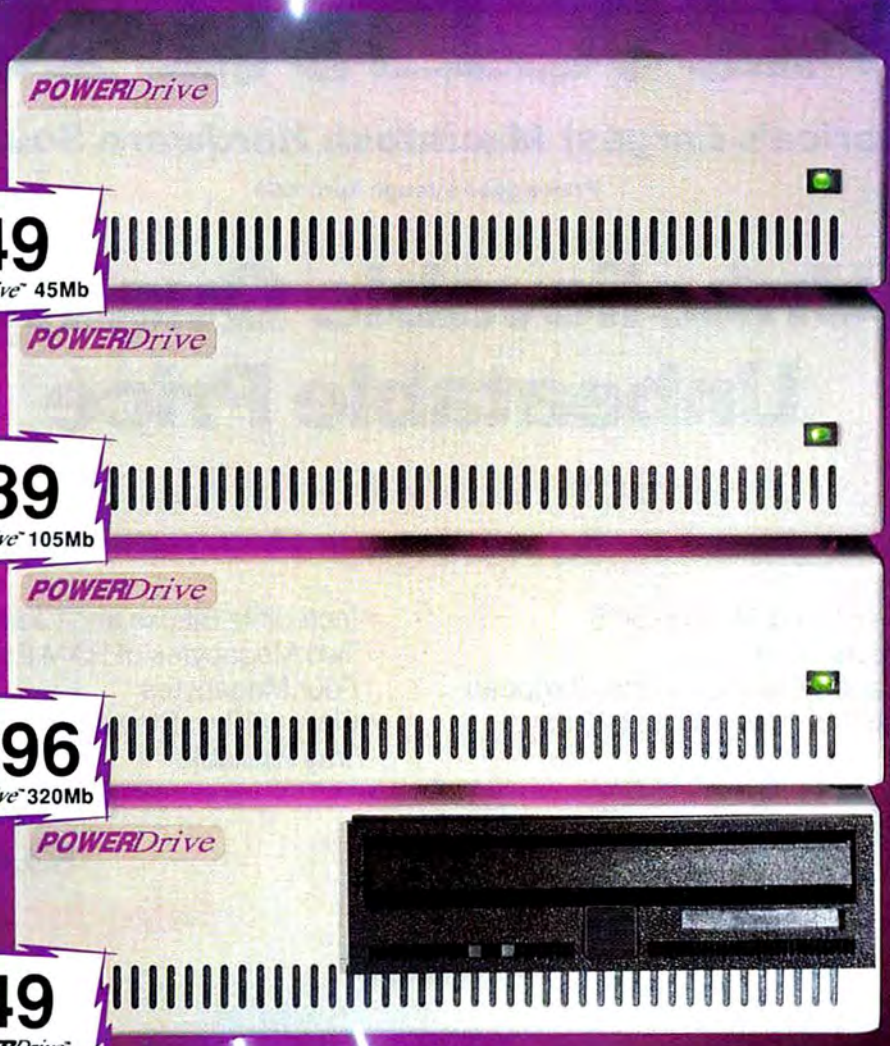
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2. Delivery— We offer ***Same Day Shipping*** on all in stock items if we receive your order by 3 pm Mountain Standard Time. ALL credit card orders are shipped by FEDERAL EXPRESS STANDARD AIR service which means you get your merchandise fast!

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3. Technical Support— MacLand has the best technical support, period. We provide you with technical support BEFORE AND AFTER your purchase. Best of all, to assure you the high est quality, our trained technicians test ALL hard disk drives for quality and viruses before we ship them to you.

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	Retail Price	Sale Price
20 Megabyte		
CMS Enhancements 20 *32ms*	~~$725.~~	**$429.**
Seagate 20 *32ms*	~~$725.~~	**$359.**
30 Megabyte		
Caché Systems 30 *28ms*	~~$799.~~	**$489.**
CMS Enhancements 30 *32ms*	~~$799.~~	**$489.**
***POWER**Drive* 30 *40ms*	~~$699.~~	**$399.**
Seagate 31 *32ms*	~~$749.~~	**$399.**



Quantum Hard Disk Drives

Industry leading Quantum quality, dependability and fast access speeds at affordable prices. Backed by our *Two Year Warranty*, all Quantum drives come complete with cables and software.

40 Megabyte		
Caché Systems 45 *28ms*	~~$899.~~	**$549.**
CMS Enhancements 45 *32ms*	~~$935.~~	**$589.**
***POWER**Drive* 45 *40ms*	~~$799.~~	**$449.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$999.~~	**$519.**
Seagate 46 *32ms*	~~$899.~~	**$449.**
60 Megabyte		
Caché Systems 60 *28ms*	~~$999.~~	**$579.**
CMS Enhancements 60 *40ms*	~~$1,025.~~	**$635.**
***POWER**Drive* 60 *28ms*	~~$699.~~	**$539.**
Seagate 62 *28ms*	~~$999.~~	**$549.**
80 Megabyte		
Caché Systems 80 *28ms*	~~$1,199.~~	**$679.**
CMS Enhancement 81 *28ms*	~~$1,299.~~	**$779.**
***POWER**Drive* 80 *28ms*	~~$1,099.~~	**$588.**
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,399.~~	**$769.**
Seagate 81 *28ms*	~~$1,199.~~	**$589.**
100-200 Megabyte		
Caché Systems 150 *16ms*	~~$2,499.~~	**$1,299.**
Caché Systems 150/150 Tape *16ms*	~~$3,299.~~	**$2,159.**
Imprimis-MacWren 170 *16ms*	~~$2,599.~~	**$1,499.**
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,999.~~	**$819.**
Quantum 120 *15ms* (2 Year Warranty!)	~~$2,499.~~	**$1,099.**
Quantum 170 *15ms* (2 Year Warranty!)	~~$2,999.~~	**$1,249.**
300-600 Megabyte		
CMS Enhancements PD 300 *16ms*	~~$4,295.~~	**$2,395.**
CMS Enhancements PD 600 *16ms*	~~$5,845.~~	**$3,485.**
Imprimis - MacWren 300 *16ms*	~~$4,295.~~	**$1,999.**
Imprimis - MacWren Runner 320 *10.7ms*	~~$4,895.~~	**$2,399.**
Imprimis - MacWren 600 *16ms*	~~$5,699.~~	**$2,799.**

SE, SE30 & IIcx, IIci Internals

20 Megabyte		
Seagate 20 *32ms*	~~$599.~~	**$299.**
30 Megabyte		
Caché Systems 30 *28ms*	~~$649.~~	**$375.**
CMS Enhancements Pro 30 *38ms*	~~$649.~~	**$399.**
Seagate 31 *32ms*	~~$649.~~	**$349.**
40 Megabyte		
Caché Systems 45 *28ms*	~~$815.~~	**$449.**
CMS Enhancements Pro 45 *32ms*	~~$825.~~	**$469.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$899.~~	**$399.**
Seagate 46 *32ms*	~~$799.~~	**$399.**
60 Megabyte		
Seagate 62 *28ms*	~~$999.~~	**$499.**
80 Megabyte		
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,299.~~	**$649.**
100-170 Megabyte		
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,899.~~	**$699.**



Imprimis MacWren

Reknown Imprimis quality for large storage needs. These drives feature access times as fast as 10.7ms in sizes ranging from 300 - 600 Megabytes. All drives come complete with appropriate brackets, cabling and as well as system and formatting software. One year warranty.

Quantum 120 *15ms* (2 Year Warranty!)	~~$2,399.~~	**$999.**
Quantum 170 *15ms* (2 Year Warranty!)	~~$2,899.~~	**$1,149.**

Mac II & IIX Internals



CMS Hard Disk Drives

Hard disk drives, tape back ups, removable hard drives, high capacity drives, CMS has them all and we carry their full line.

20 Megabyte		
Seagate 20 *32ms*	~~$599.~~	**$299.**
30 Megabyte		
Seagate 31 *32ms*	~~$649.~~	**$349.**
40 Megabyte		
Caché Systems 45 *28ms*	~~$599.~~	**$449.**
CMS Enhancements Pro 45 *32ms*	~~$569.~~	**$469.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$899.~~	**$399.**
Seagate 46 *32ms*	~~$799.~~	**$399.**
60 Megabyte		
Caché Systems 60 *28ms*	~~$639.~~	**$499.**
CMS Enhancements Pro 60 *40ms*	~~$649.~~	**$579.**
Seagate 62 *28ms*	~~$649.~~	**$475.**
80 Megabyte		
Caché Systems 80 *28ms*	~~$729.~~	**$575.**
CMS Enhancements Pro 80 *28ms*	~~$749.~~	**$669.**
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,299.~~	**$649.**
Seagate 81 *28ms*	~~$749.~~	**$499.**
100-170 Megabyte		
Caché Systems 150 *16ms*	~~$1,429.~~	**$1,199.**
CMS Enhancements PI 170 *16ms*	~~$1,699.~~	**$1,499.**
Imprimis-MacWren 170 *16ms*	~~$2,499.~~	**$1,399.**
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,899.~~	**$699.**
Quantum 120 *15ms* (2 Year Warranty!)	~~$2,399.~~	**$999.**
Quantum 170 *15ms* (2 Year Warranty!)	~~$2,899.~~	**$1,149.**
300-600 Megabyte		
CMS Enhancements PI 300 *16ms*	~~$4,395.~~	**$2,195.**
Imprimis - MacWren 300 *16ms*	~~$4,395.~~	**$1,849.**
Imprimis - MacWren Runner 320 *10.7ms*	~~$4,695.~~	**$2,249.**
Imprimis - MacWren 600 *16ms*	~~$5,995.~~	**$2,699.**
CMS Enhancements PI 600 *16ms*	~~$5,995.~~	**$3,499.**

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ON ALL IMPRIMIS, QUANTUM, AND SEAGATE HARD DISK DRIVES

No questions asked. If you are unsatisfied with any of these drives for any reason you may return them within 30 days of your invoice for a full refund less shipping and handling.

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Removables/Tape Back-Ups

	Retail Price	Sale Price
44 Megabyte Removables		
CMS Enhancements 44 *25ms*	~~$1,495.~~	**$839.**
Peripheral Land 44 *25ms*	~~$1,395.~~	**$999.**
***POWER**Drive* 44 *25ms*	~~$1,395.~~	**$749.**
SyQuest 44 *25ms*	~~$1,599.~~	**$749.**
40-150 Megabyte Tape Back-Ups		
Caché 150 Tape	~~$1,399.~~	**$789.**
CMS Enhancements 60	~~$995.~~	**$649.**
CMS Enhancements 150	~~$1,445.~~	**$849.**
Irwin 40 Meg Tape	~~$1,395.~~	**$949.**
Irwin 80 Meg Tape	~~$1,695.~~	**$1,149.**

Printers

Hewlett Packard		
DeskWriter	~~$1,299.~~	**$849.**



Syquest 44 Megabyte Removable Cartridges

MacLand offers America's lowest price on Syquest removable cartridges. Only the Syquest name assures you of full compatibility with most removable hard drives. These quality cartridges are available with a one year warranty.

Kodak		
Diconix Portable Printer	~~$899.~~	**$514.**
Ricoh		
Ricoh PostScript Laser Printer	~~$3,495.~~	**$2,495.**
Qume		
Crystal Print Publisher	~~$4,495.~~	**$2,849.**

Erasable Optical

Peripheral Land 635 Optical *45ms*	~~$5,699.~~	**$3,995.**

Memory Upgrades

One Meg SIMMS **Call.**
Mac Portable Memory Now Available.

Scanners

Abaton 300/S W/Interface	~~$1,899.~~	**$1,299.**
Abaton 300/GS W/Interface	~~$2,199.~~	**$1,475.**
Hewlett Packard ScanJet W/Interface	~~$2,190.~~	**$1,499.**
Microtek MS II Sheet Feed	~~$1,495.~~	**$1,049.**
Microtek MSF 300GS	~~$2,195.~~	**$1,479.**
Microtek MSF 300Z - Color W/Interface	~~$2,695.~~	**$1,975.**



Hewlett-Packard Deskwriter

Laser quality output from an ink jet printer. HP's newest printer is made exclusively for the Macintosh. Say goodbye to interfacing problems forever. If you've been waiting for letter quality output at a realistic price, wait no more. The ultimate HP is here!

Monitors

Magnavox 14" Color Display	~~$695.~~	**$489.**
NEC MacSync 14" Color Monitor	~~$899.~~	**$519.**



CrystalPrint Publisher

The 1989 MacUser Editor's Choice Awards Winner is lightning fast! If you are looking for a quality laser printer at an affordable price look no more, Qume's CrystalPrint Publisher is the answer.

Qume		
Qume 14" Color Monitor	~~$649.~~	**$499.**
Qume Portrait Monitor SE, II, IIcx, IIci	~~$1,149.~~	**$799.**

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Full Page Display	**Call.**
Two Page Display 19"	**Call.**
Two Page Display 21"	**Call.**
Two Page GrayScale	**Call.**
Two Page Color	**Call.**

RasterOps		
RasterOps ClearVue Mac II	~~$1,995.~~	**$1,299.**
RasterOps 19" ClearVue SE	~~$1,995.~~	**$1,399.**
RasterOps 19" ClearVue/ GS Gray Scale	~~$2,195.~~	**$1,599.**
RasterOps 16" 108 + Color System	~~$4,190.~~	**$2,949.**
RasterOps 19" 108 + Color System	~~$5,690.~~	**$3,699.**
RasterOps 16" 108 + SE30 Color System	~~$4,890.~~	**$2,999.**



Microtek Scanners

If you're serious about scanning, this is your scanner. Choose from 64 to 256 shades of grey or 8-bit color in flatbed or sheet feed formats. Microtek gives users the option of an external or built-in dual SCSI ports for added flexibility and convenience. The Microtek 300GS and 400GS include Digital Darkroom and Super Paint. The 300Z color scanner adds Photo Mac Edit. One year warranty.

Visa, MasterCard, and **American Express** accepted NO surcharge. Your Credit Card will not be charged until your order is shipped. We accept COD orders, additional $5.00 charge. AZ residents add 6.5%. All shipments made by Federal Express Standard Air which is 1 to 2 day service. COD's Shipped by UPS 2 day air. Call for shipping costs. Products purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.

The Lowest Prices with Technical Support, Too!



Hard Disk Drives

	Internal	External
Seagate 20	$299	$359
Seagate 31	$349	$399
Seagate 46	$399	$449
Seagate 62	$475	$549
Seagate 81	$499	$589

30 DAY MONEY BACK GUARANTEE

ON SEAGATE HARD DISK DRIVES

No questions asked. If you are unsatisfied with any of these drives for any reason you may return them within 30 days of your invoice for a full refund less shipping and handling.

RasterOps 19" 108 + SE30 Color System	~~$5,790.~~	$3,799.
RasterOps 16" 224 Color System	~~$6,990.~~	$4,849.
RasterOps 19" 224 Color System	~~$8,190.~~	$5,599.
RasterOps 264 Color Board, II	~~$995.~~	$699.
RasterOps 264 Color Board, SE	~~$1,295.~~	$899.
RasterOps FrameGrabber	~~$1,995.~~	$1,299.
Samsung 15" Full Page Monitor and Card	~~$999.~~	$589.



SIMMS

MacLand has memory in stock! Call us for our current prices. Remember, if you bought your memory from someone else, you probably paid too much!

Sony 1302 Color Monitor	~~$995.~~	$659.
Sony 1304 Color Monitor	~~$1,099.~~	$719.

Accelerator Boards

radius™

Radius 16 for MacPlus or Mac SE		Call.
Radius 25 for Mac SE		Call.
Siclone Si3033 33Mhz for Mac II, IIx, IIcx	~~$3,995.~~	$2,799.
Siclone Si3033 33Mhz with 68882 for Mac II, IIx, IIcx	~~$4,995.~~	$3,499.

Modems/Fax Modems

Abaton Fax Modem 4800 Baud	~~$395.~~	$259.
Abaton Fax Modem 9600 Baud	~~$595.~~	$399.
Hayes 2400 External	~~$499.~~	$379.
Hayes 2400 Internal	~~$499.~~	$379.
Hayes 9600 V.42 External	~~$999.~~	$755.
Hayes Interbridge	~~$799.~~	$635.
Orchid Fax Modem 9600 Baud	~~$899.~~	$439.
Telebit T-1000 9600 Baud	~~$745.~~	$679.
Telebit T-2500 19,200 Baud	~~$1,495.~~	$1,229.



Raster Ops Color Monitors

Choose between 16" and 19" Trinitron Color Monitors from Raster Ops, the premier manufacturer of large screen color displays. Whether you require 8, 24 or 32 bit color, you can be assured the end result will be crystal clear high resolution images. Our prices include the card, cables and software. One year warranty.

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Kennect Technology Rapport	~~$295.~~	$215.
Drive 2.4	~~$495.~~	$349.

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- ☐ a) Mac Plus
- ☐ b) Mac SE
- ☐ c) Mac II
- ☐ d) IBM PC
- ☐ e) Other

2. For how many micro computers do you buy products?

- ☐ f) 1-4
- ☐ g) 5-49
- ☐ h) 50+

3. Your primary job function is: (check one)

- ☐ i) Administrative/General Management
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- ☐ q) Project Managers
- ☐ r) Word Processors
- ☐ s) Database Managers
- ☐ t) Graphics
- ☐ u) CAD/CAM
- ☐ v) Communications

HARDWARE
- ☐ w) Mainframe
- ☐ x) Mini
- ☐ y) PC
- ☐ z) Printers/Plotters
- ☐ 1) Monitors
- ☐ 2) Disk/Tape Back-up
- ☐ 3) Add-in Boards
- ☐ 4) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?

- ☐ 5) Yes
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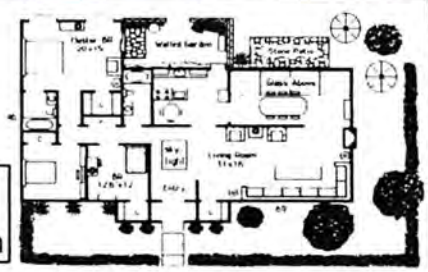
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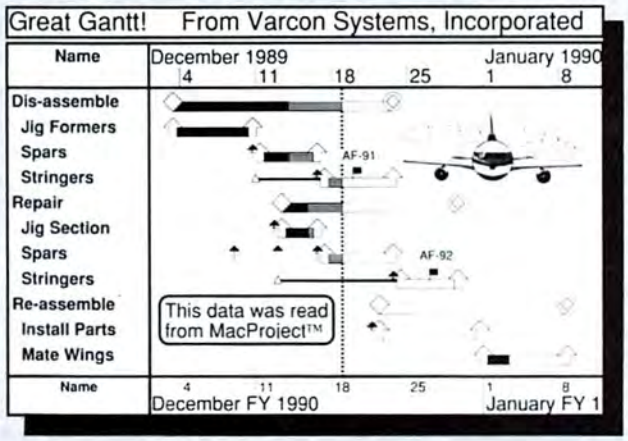
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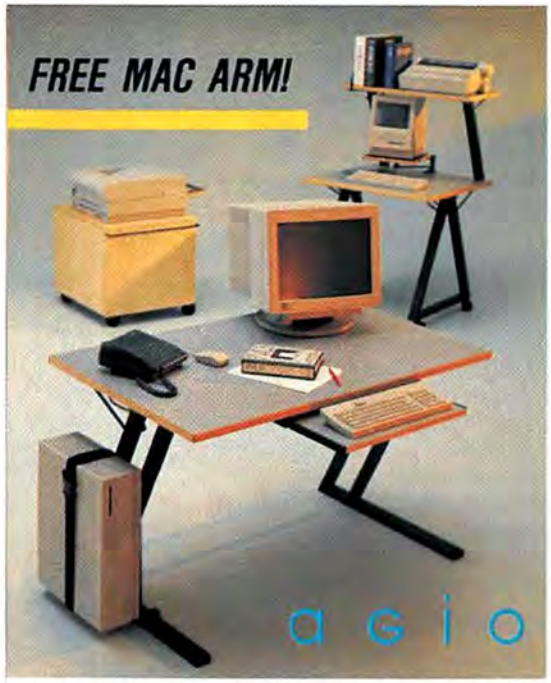
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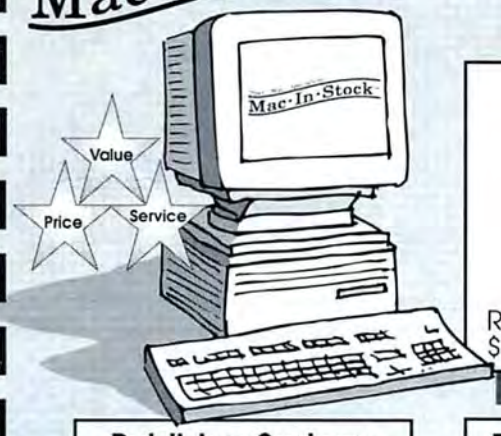
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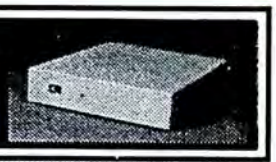
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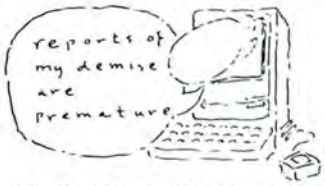
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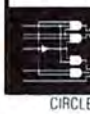
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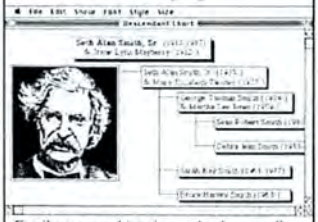
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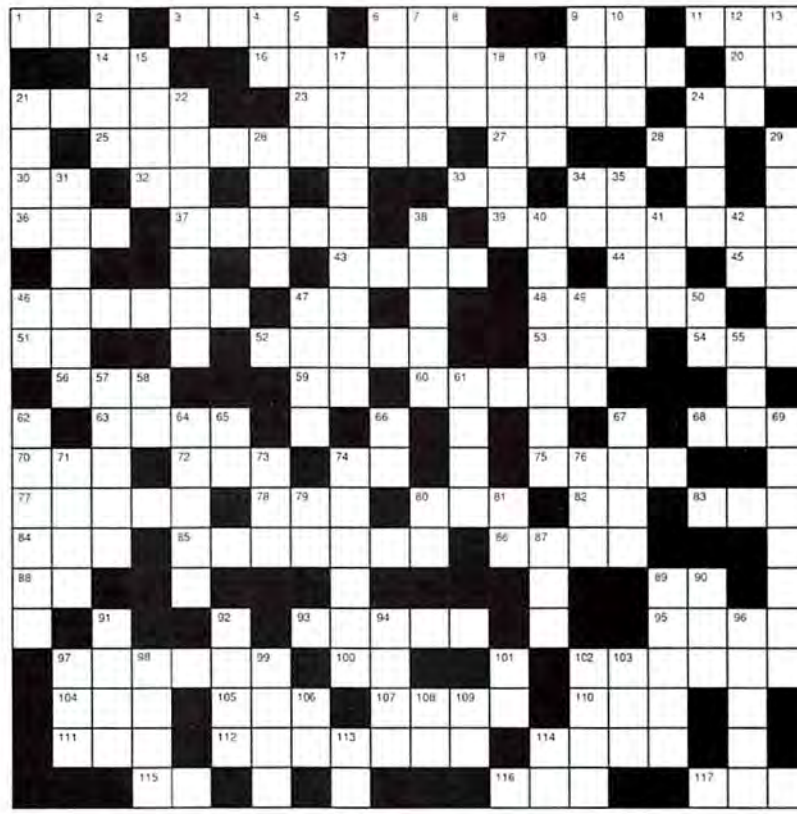
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NOHJ C. KAROVD

This new monthly feature of back-page fun and games begins with a crossword puzzle submitted to us by Nhoj C. Karovd, the noted Bombay-based puzzle master. Enjoy!



[Answers will appear in next month's Letters column.]

ACROSS

1. Incorrect "singular" unit of measure for a computer running at exactly one million instructions per second, or Conehead expletive
3. One of the two Steves, or layoff losses
6. Systems Application something-or-other (an IBM term)
9. Some Silicon Valley execs are driven to this
11. The SPARC chip rose here
14. When programmers get sick of Jolt, they drink this
16. The newest sister publication of *MacUser*
20. Half of mediocre synonym
21. Buyers of the 128K Mac system, or "April ___"
23. A kind of decision
24. This is the flip side of artificial intelligence
25. The machine you probably own if you read this magazine
27. No. in an error message
28. Kind of electricity, or a cool car option
30. Type of assembly lang. code
32. The bus used by the Mac II
33. Before you use a computer, it must be thus
34. Bull!
36. European video standard, or type of chip
37. Olivier and Nelson
39. Soporific networking protocol
43. A Drug store in the middle of nowhere
44. Backward Boolean
45. Mitch Kapor et al. used to teach this meditation technique
46. All computers should have one
47. When programmers suggest going to a computer show, their dates say this
48. The pueblo that PostScript built
51. Ma Kettle's husband
52. They got their revenge on film
53. Ubiquitous office mach.
54. *MacUser*'s short Sheet
56. Mininet
59. 490, when in Rome
60. A keyboard key used to produce uppercase letters
63. "Tonight Show" substitute host
68. Homonym for 32 across
70. The man who is always out
72. You put electrodes on your chest for this
74. See 66 down
75. A really big and fast computer
77. Mickey's got one on his computer
78. Homonym for usual number of bits in a byte
80. Fancy name for the boss
82. Wire service
83. Seattle linebacker
84. MacInTax can help with these guys
85. Ubiquitous Apple marketing adjective
86. This famous type designer was no dingbat
88. Iowa Software company
89. Magazines always have room for one more
93. One flu into the cuckoo Mac
95. Apple's first attempt at the Mac
97. A non-Apple computer you can use on a plane
100. Yes, in Barcelona
102. A terrific computer columnist
104. Kind of IBM color card
105. Flying sonar-based mammal
107. What most engineering students never see
110. ___ -Tin-Tin
111. ___ of iniquity
112. What one hears from a room of programmers when the power fails during large compiles
114. There is nothing like one
115. Rear end of DTP
116. Time-less European spreadsheet program
117. Apple's top printer model

DOWN

2. Formal dance, or memory type
4. The Queen's gas
5. Singing style, or Chips & Technology DOS product
6. What someone does when their hard disk crashes
7. *Witness* milieu, sans sibilant
8. Apt name for a programming language
9. What a Mac fan sucks
10. Type of girl preferred by a computer-science major
12. A country quickly falling behind Japan
13. Anagram of 33 across
15. Hatfields, McCoys, or the original McIntoshes
17. This kind of puzzle
18. Many programs are worth their weight in this golden liquid
19. Just a bit
21. The Apple "twiggy" disk drive was this
22. Former Pepsi mogul
24. A little drawing on the screen
26. Next level down from dweeb
29. MacPaint-style graphic
31. Programming language named for Jean-Louis compatriot
34. What you say when someone tells you that you're unzipped
35. Company that says it invented the Mac interface
38. Roomful of students
40. This often clogs freeways and networks
41. *MacUser*'s Mr. Wiggins, for short
42. Famous alien
46. "Drawing the Line" author, initially
47. Steve Jobs' new venture
49. Backup and audio medium
50. He phoned home
55. Sputnik-era pres.
57. FreeHand comes from these folks
58. 180° from S.W.
61. What programmers do when the boss is coming
62. What programmers read
64. Requires or requirements
65. Ubiquitous dialog-box button
66. A programmer's leap of logic (with 74 across)
67. Same famous typeface designer you couldn't figure out earlier
69. The nicer of the two Steves
71. *Infernal* illustrator Gustave
73. Too much pizza gives you this malady
74. Addictive glasnost game
76. Run-D.M.C. genre
79. A Solver
80. Backwards personal computer
81. Where the Wizard lived
87. Opposite of subtract
89. How the best programming is done
90. A command Mac users are spared
91. Aldus helped it meet its Maker
92. Criminal associations
94. Costa ___
96. Opposite of sinner
97. Hard-disk blinker
98. What out-of-shape programmers do after walking up five flights of stairs
99. When you lose your job, you do this
101. Floppy dsk. format
102. Mousy motion
103. You're full of this before you're full of vigor
106. FDR's Rough Riding relative
108. Best-selling mantra
109. Extra sensory, without any perception
113. Reese's Pieces aficionado
114. Captured computer criminals will meet this guy, probably under the Apple

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